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ANNALS OF SURGERY

A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE.

EDITED BY

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ANNALS OF SURGERY.

THE OPERATIVE TREATMENT OF THE HYPERTROPHIED PROSTATE.¹

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IN THE short space which I have allowed myself for the presentation of this subject, there is not room for an exhaustive consideration of this topic, and much that is appropriate to its discussion is of necessity omitted. It has been thought better to concentrate the field of this investigation mainly upon the establishment of definite underlying principles and an exposition of the reasons therefor.

ENUMERATION OF METHODS.

The operations that have been performed for the relief of the hypertrophied prostate are *Palliative and Radical*.

The *palliative* consist in draining the bladder through the perineum or from above the symphysis pubis, namely:

1. Perineal urethrotomy or cystotomy.
2. Suprapubic puncture with retained cannula.
3. Suprapubic cystotomy with retained drainage tube.

The *radical* imply the division of or the removal of a part or the whole of the median enlargement or a lateral obstructing portion. To this end we have:

¹Read before the Association of American Genito-Urinary Surgeons, Washington, D. C., September 19, 1888.

1. Division of the median obstruction by suitable burning or cutting instruments, passed from the meatus—urethral prostaticotomy, (Guthrie, Civiale, Mercier, Teevan, Gouley, Bottini, etc.)

2. The removal of the whole or a part of the median obstruction by similar means, or by the ecraseur—urethral prostatectomy, (LeRoy d'Étiolles, Mercier, Gouley, etc.)

3. The same ends accomplished through a perineal section of the urethra, perineal prostaticotomy and perineal prostatectomy, (Gouley, Harrison, Belfield, Keyes, Annandale, Cabot, etc.)

4. Tunnelling the median enlargement and subsequent drainage, (Harrison.)

5. The removal of a part or the whole of the obstructing prostatic portions through a supra-pubic cystotomy—supra-pubic prostatectomy. (Dittel, Billroth, McGill, Atkinson, Belfield, etc.)

The methods of iodine injections into the substance of the gland (Heine,) of electrical superficial cauterization, (Newman,) of electrolysis by electrodes inserted into the gland (Biedert, Caspar, etc.,) will not be considered here, for while they may in the future be so developed as to be of value, their results are as yet too uncertain to require serious discussion.

INDICATIONS FOR OPERATION.

This investigation does not apply to the majority of all persons affected with prostatic hypertrophy. They do well under the palliative forms of treatment. But only to that minority of sufferers from aggravated forms of the malady—such, for example, as have the following symptoms:

Inability to urinate spontaneously, frequent attacks of retention (*especially when they are not within reach of skilful catheterization*), difficult, very frequent (once an hour) or painful catheterization, impossibility of catheterization—a purulent or hemorrhagic cystitis, *and failure of palliative treatment* (bladder washes, medicaments, hygiene.)

For such or similar grades of the disease I wish to establish

once for all the claim of the *necessity* of surgical interference. How needful such a claim is may be judged by the status of

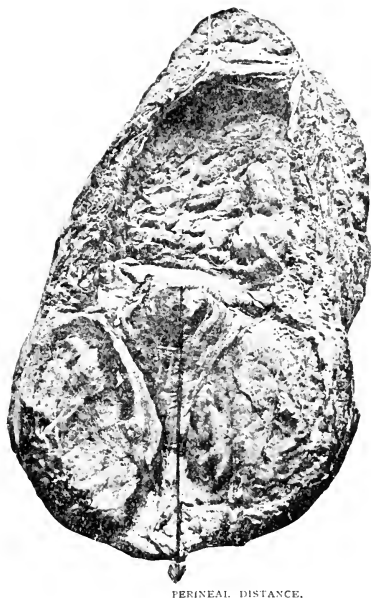


FIG. 1.—SPECIMEN OF BILATERAL AND MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class I.*

1. Perineal distance $2\frac{1}{4}$ inches.
2. A bladder of small capacity and non-distensible.
3. The median portion but slightly enlarged, approaching the form of a bar between the lateral lobes.

A case in which Mercier's or Bottini's operation could have been employed, but the median enlargement being within reach from the perineum, and central division being all that is needed, it is well suited to perineal prostatotomy; while there is, moreover, not only no demand here for the suprapubic method, but on the contrary, the contracted rigid walled bladder of small capacity constitutes a contra-indication to its performance.

surgical opinion of to-day in regard to the matter, which may be learned from the following quotations :



FIG. 2.—SPECIMEN OF LATERAL AND MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class. 1*

1. Perineal distance $2\frac{1}{4}$ inches.
2. The median enlargement is here greater than in Fig. 1 and more salient.
3. A large bladder, and distensible.

Bertini's and Merzler's operations difficult of performance in such a case. The median growth is within reach from the perineum. Its larger size than in the foregoing specimen, however, calls for more than central division. The removal of a V-

Professor Guyon remarks that if we examine the specimens of hypertrophied prostates, furnished by autopsies, it is extremely rare to find one of such a form, that any benefit could have been derived by any plan of incision or excision, and in 1887 he entirely condemned all radical operations upon such cases.

Socin takes the same ground.

Sir Henry Thompson (in the *British Medical Journal*, Nov. 17, 1887,) reports a case of suprapubic cystotomy with retained cannula for relief of prostatic obstruction in a patient aged 64, who derived great benefit from this procedure and advocates this treatment in similar cases. In the same meeting at which this occurred there are also reported by Mr. McGill three cases of suprapubic prostatectomy in elderly people, all of whom made a rapid recovery, were restored from a suffering and dangerous condition to health—and two of them at any rate regained the power of voluntary urination. After which Sir Henry is reported as saying that in cases of long standing prostatic hypertrophy he did not believe that the removal of the growth would be of any permanent benefit.

In the discussion following, Mr. Heath encouraged the plan of operation as practiced by Mr. McGill in his cases, viz. the suprapubic one.

Mr. Barwell advocated a more extended trial of the same method.

Mr. Bryant thought it an open question whether it was better to attack these cases by the perineal or the suprapubic route.

Mr. McGill said that the supra pubic route was by far the better one.

In 1887 Landerer reported a case of perineal prostatectomy and advocated *that* method of treatment.

or U-shaped piece would answer better. Perineal prostatectomy is here the operation of choice—although the suprapubic route is here possible owing to the large capacity of the bladder. If this had been done, however, in this case, the presence of a diverticulum with very thin walls which may be seen at the fundus of the bladder would have doubtless caused an intra-peritoneal rupture of the viscus. This condition could not, of course, have been foreseen. In the prostatic urethra are two false passages, due to bad catheterization, causing the patient's death. *Bad catheterization is the most dangerous of all operations in these cases.*

Mr. Reginald Harrison believes in operations in suitable cases either by tunnelling the median enlargement from the perineum or dividing or removing it from the same point or from above the symphysis pubis, but gives no reasons governing the choice of operations.

Teevan and Gouley advocate Mercier's operation—though preferring to approach the obstructions from the perineum.

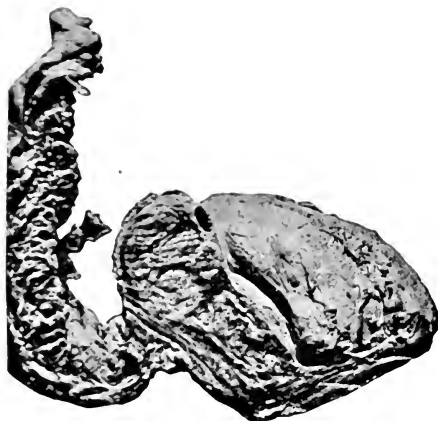


FIG. 3.—A PROFILE VIEW OF FIG. 2.

This incidentally shows the deep *bas fond* behind the prostate; in this case, it was occupied by fifty-nine fragments of some pure uric acid stones that had undergone spontaneous fracture. The patient was not aware that he had stone and indeed had no urinary symptoms until ten days before his death.

Bottini advocates his operation with the galvano-cautery from the meatus.

Dittel and Billroth favor supra-pubic prostatectomy in some extreme cases,—though the former is also an advocate for supra-pubic puncture with retained canula, in spite of the fact that a majority of nearly one hundred cases in which he employed it died soon afterwards.

Dr. Belfield, of Chicago, in an interesting article on fifteen cases of bladder exploration condemns the operations of Mer-

cier and Bottini, and states that the supra-pubic is greatly superior to the perineal method of operation. And so might be quoted others to the same effect.

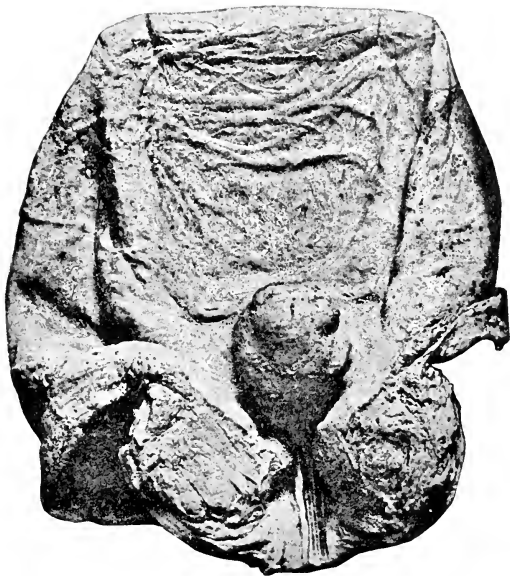


FIG. 4.—SPECIMEN OF BILATERAL AND MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class I.*

1. Perineal distance $2\frac{1}{2}$ inches.
2. Median enlargement salient and broadly pedunculated.
3. Thin walled, distensible bladder of large capacity.

Median enlargement within reach from the perineum, but the growth is too large and salient to make its central division effectual in removing the obstruction, and also makes it difficult to apply instruments even from the perineum to remove a part or the whole of it.

On the other hand the great bladder capacity renders the suprapubic operation very easy, and it consequently becomes decidedly the method of choice in such a case.

Now my intention in delaying to make these quotations is

to bring out conspicuously the fact, that firstly, the best surgi-



FIG. 5.—SPECIMEN OF BILATERAL AND MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class 1.*

1. Perineal distance $2\frac{3}{4}$ inches
2. Large salient broadly pedunculated median enlargement.
3. A bladder of large capacity.

This specimen represents a still greater degree of median enlargement than the preceding ones, and the same conclusions as to choice of method are true to even a greater degree than in the last instance. The suprapubic route is here decidedly that of choice.

cal opinion is at variance as to the propriety of any radical measures in these cases. (Guyon, Sir Henry Thompson, Socin

in the negative), and secondly, that from amongst those who do advocate them, no one has told us why one method is better than another, whether one method is applicable to all cases, and if not!—why not! In other words, no *rationale* underlies the operative treatment.

It is the chief object of this communication to show that the opinions of those on the negative side of the question, (condemning operative measures) are not in accordance with the evidence at our disposal, and furthermore, to lay down the rationale of the operative treatment with the definite



FIG. 6.—A PROFILE OF THE LAST SPECIMEN. SHOWING MORE ACCURATELY THE FORM OF THE MEDIAN ENLARGEMENT, AND THAT IT IS WELL SUITED TO ECRASEMENT BY THE SUPRAPUBIC ROUTE.

reasons therefor, in the hope that it may serve as a ground for future surgical action.

To do this I have to offer data of two sorts: 1, anatomical and 2, clinical.

The anatomical collection consists of thirty specimens furnished by autopsies. This series agrees, in the main, with respect to the relative frequency of the enlargement of the different prostatic portions with the well known collections of Sir Henry Thompson and Dittel. It may consequently be taken as a type of all cases of the disease, and inferences drawn

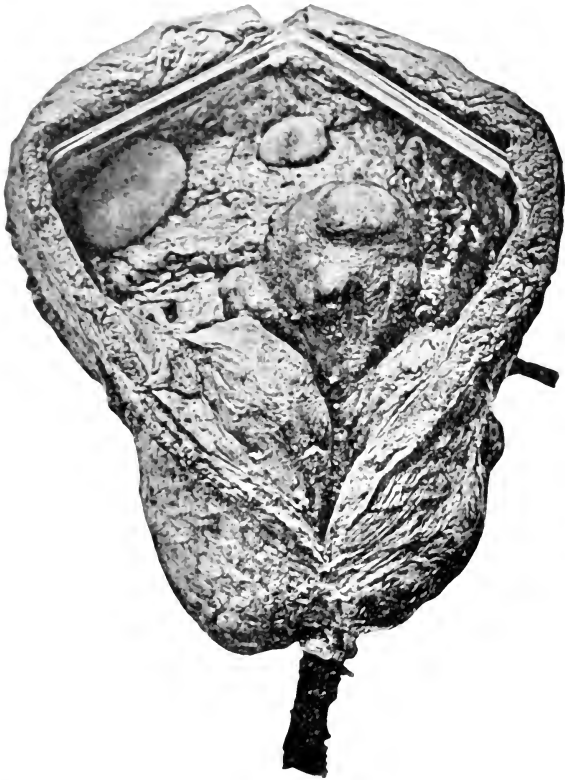


FIG. 7.—SPECIMEN OF BILATERAL AND MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class 1.*

1. Perineal distance, 4 inches.
2. A median enlargement of great size broadly pedunculated.
3. A bladder of large capacity.

This represents one of the furthest developments of the median enlargement. The long perineal distance and the great size, and the salient form of the growth make the suprapubic method imperative here, while the capacity of the bladder allows of its performance. The suprapubic operation is the only one by which such a growth could have been approached with any hope of success. This specimen ends *Class 1*. The specimens have been arranged to show a progressive development of the median enlargement from a very moderate to a great size.

from its study are applicable to any conditions liable to be encountered.

In looking at the plates of these specimens which are here reproduced three-fourths of the actual size from photographs of the object, there are three essential points to keep constantly in mind as being the determining factors in the choice of operation, anatomically speaking. These are: 1. *The distance from the junction of the prostatic and membranous urethra to the most distant point of the median enlargement within the bladder. This distance I shall for the sake of convenience call the perineal distance.*

Its importance lies in the fact that upon its length depends the possibility or impossibility of reaching efficiently with the finger from the perineum the obstructing portion and working upon it.

If it is not more than three inches the median enlargement (which, as we shall see, is almost invariably the offending member) is within working reach of most surgeons' index finger passed through an external perineal urethrotomy. If longer it will require an exceptionally long finger to reach it. This limit is, therefore, selected as the most generally applicable.

2. *The form of the median enlargement.*

This is important too, for (a) only when it approaches the form of a bar at the neck of the bladder, or between the two lateral lobes, or is but slightly differentiated into the so-called "third" lobe can it be successfully attacked by either Mercier's or Bottini's operations. (b) If very salient or pedunculated, division centrally alone, even if within reach from the perineum, will not be sufficient, and removal of part or whole most difficult, owing to the cramped space offered by the perineal route so that such cases are better approached by the supra-pubic route, and the possibility of doing this latter with its modern technique, (distending the bladder and elevating it by rectal ballonement) depends upon *whether bladder is of small capacity and non distensible, or on the contrary, of large capacity and distensible.* In what way these three determining anatomical factors harmonize with the clinical experience will be seen later.

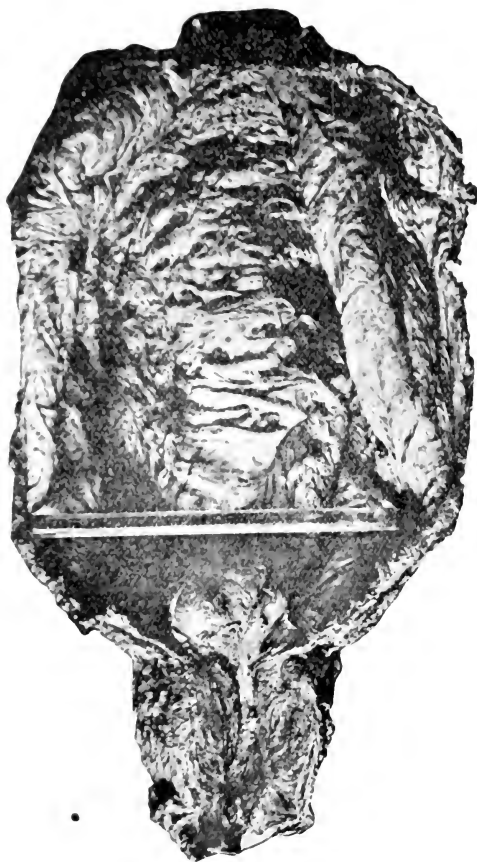


FIG. 8.—SPECIMEN OF MEDIAN PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class 2.*

Median enlargement only. This class furnishes those cases best adapted to the perineal operations, owing to the short perineal distance due to the absence of

The specimens are divided into five separate classes which represent practically all the varieties of form in which the disease occurs.

Class 1.—Contains specimens of bilateral and median enlargement; fourteen examples.

Class 2.—Median enlargement only; nine examples.

Class 3. Bilateral enlargement only; four examples.

Class 4.—Median and unilateral enlargement; two examples.

Class 5.—Separate pedunculated tumors; one example.¹

To return to the anatomical specimens—what their study has shown us is this. That contrary to the statement of Prof. Guyon, the large majority of cases *do* present such forms as to render radical operations possible and often easy.

In almost every instance (28 out of 30 cases) the median growth constituted the *chief* obstacle to urination. In ten cases, it proved its *only* obstacle. Consequently in the great majority of cases a successful attack upon this portion will yield the desired result.

Further, in twenty-one of the thirty specimens, (more than two-thirds of all) the median enlargement was within reach from the perineum and that in ten, or nearly one-third of the cases, the small capacity of the bladder and the rigidity of its walls made the supra-pubic operation (with its modern technique, always understood) impossible.

¹Neither the etiology, the secondary effects, nor the microscopic pathology of the hypertrophied prostate are to be here discussed. It is desired to concentrate the attention on its operative treatment. I have made, therefore, no reference to the interureteral bar, the construction of the bladder floor, trabeculation etc.

As many of the specimens are for all practical purposes repetitions I shall only present a few of them as typical examples, drawing conclusions, however, from the whole number. Any one who may be interested in studying the entire collection where the exact conditions are shown is referred to the author's monograph on the subject. (Cupples and Hurd, Boylston Street, Boston.)

lateral hypertrophy, which determines, as a rule, its greater length when present, as we have just seen in Class 1.

1. Perineal distance, $2\frac{1}{2}$ inches.
2. A median enlargement of moderate size broadly pedunculated.
3. A bladder of large capacity.

A case easily reached and treated by perineal prostatotomy or prostatectomy.



FIG. 9. SPECIMEN OF MERIDIAN PROSTATIC ENLARGEMENT.

From a plaster cast. Three-fourths actual size. *Class 2.*

1. Perineal distance, $3\frac{1}{2}$ inches.
2. A large median growth, about the size and shape of the unimpregnated uterus.
3. A bladder of large capacity.

On the other hand, in seven cases the great perineal distance made the low operation impossible.

In those instances, while in a few more the salient or pedunculated form of the growth, even though it was within reach from the perineum, made its removal in the cramped space offered by that route so difficult that the supra-pubic method became in these also the more desirable one.

In other words, the anatomical forms and conditions of this disease are such, that no one method is adequate for or applicable to all the varieties to be encountered, and that contrary to what would be inferred from the authors quoted previously in this article and others, *we do not have our choice of a variety of procedures, but are urged to one or another in any given case, according to the conditions encountered in that case, and in obedience to the definite reasons in connection with it first laid down.*

CLINICAL DATA.

It remains to sift the clinical evidence.

This has been found unusually difficult for the reason that the reports of cases are so meagre and incomplete in their essential details. We learn, for instance, that Mercier performed his operation upon upwards of four hundred patients, but out of this number there are only the fifteen (those subjected to examination by a scientific jury), of whom there is at all a satisfactory account, and we have to rest content with the surgeon's statement that he was ^{never} ~~never~~ satisfied with the results. Such generalities cannot, of course, be embodied in a statistical reckoning. Again, the same is true of nearly one hundred cases of suprapubic puncture done by Dittel. In only a few of the cases are we told of the clinical details. The professor says that he, too, is much pleased with the results of the ope-

The great perineal distance is here due to the size of the median enlargement alone, an unusual condition. Owing to its length and to the form of the growth, the perineal operations are here out of the question, and the suprapubic, rendered possible by the large bladder, is that of choice.

This is a case in which rectal examination would have probably entirely failed to give an accurate idea of the extent and form of the growth.

ration, but adds that the majority of the cases died shortly after its performance.

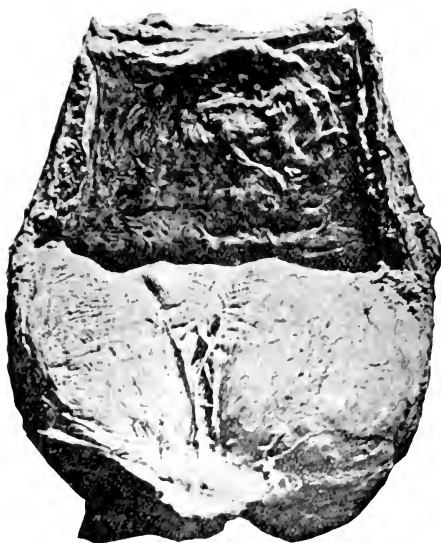


FIG 10. SPECIMEN OF BILATERAL PROSTATIC ENLARGEMENT WITH CONNECTING BAR BETWEEN THE LATERAL LOBES.

Three-fourths actual size. *Class 3.*

1. Perineal distance $2\frac{3}{4}$ inches.
2. Bar between the lateral lobes, the form of median obstruction.
3. Contracted and rigid walled bladder of very small capacity.

Median enlargement within reach from the perineum. Central division of the median obstruction is all that is needed. Perineal prostatotomy the operation of choice. The suprapubic method impossible owing to contracted and small bladder.

As a result of an examination of the comparatively small number of detailed reports coming from reliable sources, to which I have confined myself, we have of—

PALLIATIVE OPERATIONS.

	Cases.	Deaths.
1. Suprapubic puncture with retained cannula, - - -	12	9
2. Suprapubic cystotomy with retained cannula, - - -	5	2
3. Median perineal urethrotomy, drainage, - - -	8	1
	—	—
	25	12

Mortality—48 per cent.

RADICAL OPERATIONS.

	Cases	Deaths.
1. Prostatotomy from meatus, - - - - -	11	2
2. Prostatotomy from perineum, - - - - -	10	1
3. Prostatectomy from meatus, - - - - -	4	1
4. Prostatectomy from perineum, - - - - -	12	1
5. Supra-pubic prostatectomy, - - - - -	11	3
	—	—
	48	8

Mortality—17 per cent.

PERMANENCY OF RESULTS AND BENEFITS.

Palliative Operations.—1. Suprapubic cystotomy and permanent drainage—3 cases under observation for one year; all were restored to health and comfort.

2. Perineal drainage—3 cases under observation more than one year; restored to health and comfort.

Radical Operations.—1. Urethral prostatotomy—5 cases under observation for two years; well until then, when in three of them symptoms of urinary obstruction returned; five cases more, observed for six months, during which time they remained entirely free from urinary symptoms.

2. Perineal prostatotomy—4 cases under observation for two years, free from urinary symptoms during this time; general health restored; two cases were observed for six months; entirely well during that time.

3. Perineal prostatectomy—one case observed for more than one year; relief of all urinary symptoms.

4. Three cases of suprapubic prostatectomy, observed for eight months; restoration of general health, of bladder function, and relief of all urinary symptoms.

Of nineteen palliative operations six were known to have been entirely relieved for at any rate one year. Of forty-three



FIG. 11. SPECIMEN OF BILATERAL PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class 3.*

1. Perineal distance, $2\frac{1}{4}$ inches.
2. Form of median obstruction, a bar between the lateral lobes.
3. A large bladder.

radical operations nineteen were relatively well for at least one year subsequently. Many patients passed from observation at a period too early to judge of the final result.

Before summing up the clinical evidence I wish to give a brief account of two cases in which I have performed radical operations, and describe a new instrument lately devised by me for the performance of some of the radical methods.

CASE I.—The patient was a man of 80 years of age; for three years he had been suffering from symptoms of urinary obstruction due to an enlarged prostate, latterly he had had several attacks of retention; in one of these catheterization resulted in a false passage in the prostatic urethra, rendering further introductions of the instrument almost impossible, and a cystitis supervened. An extensive bilateral hypertrophy of the prostate was present, and a bladder of large capacity. Through the kindness of Dr. E. H. Bradford, in whose service at the City Hospital he was, I was enabled to operate upon this patient. The supra-pubic method was chosen. The bladder opened without difficulty, after injecting it and raising it with the rectal balloon. A median enlargement of the prostate of crescentic form was found partially surrounding the bladder orifice, and obstructing the flow of urine. The more prominent portion of this was removed by a pair of cutting forceps, in three masses—in all about the size of an unshelled almond. No hæmorrhage took place. The bladder and outer wounds were left open and a double drainage tube inserted into the bladder; through an antiseptic dressing. These tubes carried off all the urine into a receptacle, and the dressings were scarcely moistened. The patient did excellently well for three days; on the fourth his temperature rose suddenly and finally reached 106°F; he became unconscious and died in twelve hours. The quantity of urine continued sufficient until his death, although it was of low specific gravity. A partial autopsy only was allowed, namely of the organs of the genito-urinary tract. The site of the removal of the growth was healing with healthy action. There was no suppuration in or about the wounds of the bladder or outer tissues, no peritonitis, no septic process to be found. The kidneys did not present sufficient organic change to account for death. The diagnosis of death probably from acute irritative urinary fever (so-called) was made.

This specimen only differs from the last in having a large bladder, allowing the performance of the suprapubic method if desired, but as the median obstruction is within reach of a perineal prostatotomy that becomes the operation of choice.

CASE II.—The patient was a man, æt. 74; symptoms of urinary obstruction had been present for six years; catheterization necessary for three years; purulent and hæmorrhagic cystitis for three months, and for the same period he required to use the catheter every half hour day and night, and always with pain. Palliative treatment failed to



FIG. 12. SPECIMEN OF MEDIAN AND UNILATERAL PROSTATIC ENLARGEMENT.

Three-fourths actual size. *Class 4.*

1. Perineal distance, $1\frac{3}{4}$ inches.
2. Irregular enlargement, the median and left lateral portion being hypertrophied and fused in one growth of moderate extent.
3. A small contracted bladder.

Owing to the small capacity of the bladder, it is unapproachable by the suprapubic route, but within easy reach of a perineal operation.

relieve. At the end of May last he was etherized, and I found that even under ether, the small rigid walled bladder would hold only two ounces of fluid. A perineal prostatotomy was decided upon in consequence. The "perineal distance" was so great (certainly $3\frac{1}{2}$ inches) that it was only by strong pressure (counterpressure also being ex-



FIG. 13. SEPARATE PEDUNCUATED PROSTATIC TUMORS VIEWED FROM THE URETHRAL SIDE.

Bladder turned over out of sight. Three-fourths actual size. *Class 5.*

1. Perineal distance, $2\frac{3}{4}$ inches.
2. Two growths, one from each side of the median portion, divided by a deep groove representing the continuation of the urethra, and two larger growths above, one from each lateral lobe.
3. A large distensible bladder.

The complicated form of the growths here make their eradication far easier from the suprapubic than from the perineal route.



FIG. 14. THE SAME AS FIG. 13 VIEWED FROM THE VESICAL SIDE.

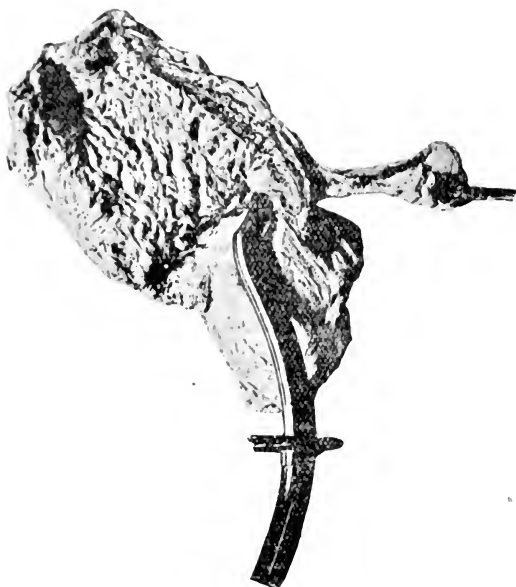


FIG. 15. A FORM OF PERINEAL DRAINAGE, LATELY DEVISED BY THE AUTHOR TO USE AFTER PERINEAL SECTION FOR ANY PURPOSE, DEPICTED IN SITU AFTER A PERINEAL PROSTATECTOMY.

The following objects are accomplished in its construction. Its end occupies the lowest portion of the bladder and is smooth and round; its calibre is large; a large smooth-edged eye is placed close to its bladder end, leaving no cul de sac beyond it for the lodgment of dirt, and giving exit to large clots or debris.

The direction of the shaft is such as to correspond to that of the posterior urethra and to fit it, while its external portion is parallel with the bed's surface when the patient is lying on his back. This direction of the shaft of the tube was established by measurements with soft metal on twenty cadavers, and will be found to fit the average case. To accommodate itself to the varying lengths between the surface of the external wound and the bladder, the plate, by which the tube is held in place, can be pushed forward or back upon the shaft by firm pressure, but will stay where it is put. It should be passed into the bladder with its end pointing upward, and turned over after entering the viscus. The flow of fluid through it from the bladder is taken as a guide to fixing the plate. The tubes are of different calibres and every second number is furnished with a ridge just anterior to its eye, so that they can be converted into *canule a chemise*, if desired.

erted downward above the symphysis pubis), that the entering finger could reach with its tip the neck of the bladder. There it found the fortunate condition of a median enlargement of the form of a bar between the lateral lobes. This was divided centrally by a probe pointed bistoury. One of the drainage tubes already described was then inserted. This was worn for three weeks continuously, and at night ever since (six months to date). The patient made a rapid recovery; on the third day the blood disappeared from the urine; at the end of three weeks the urine was almost entirely clear, and the capacity of the bladder had increased to five ounces. He then went home.

The power of voluntary urination was not restored. During the day time he removes the perineal tube and goes about using a soft catheter to empty the bladder, passing it through the perineal opening about once in three hours. At night the stiff tube is resumed and he sleeps quietly all night. In this case the failure lies in the lack of restoration of the natural power to urinate; otherwise the change in the patient's condition is from one of extreme suffering and danger to entire comfort, usefulness and health.

The instrument I have to suggest is practically Mercier's prostatectatome converted into a galvano-cautery, the intention being to use it through the perineal or suprapubic route to remove central portions or the whole of the median enlargement piecemeal, as the case may require.

In form it is a short and broad bladed lithotrite, both blades being centrally cut away into large oval fenestra. Upon the inner and opposing surfaces of each blade, surrounding its fenestra, is fitted a corresponding surface of petrified wood. Two platinum wires (isolated) are conveyed through the handle and hollow center of the inner blade, at the distal end of which they emerge and unite above in the form of an oval loop corresponding to the form of the petrified wood upon which this loop rests. The obstructing portions of the prostate being caught between the two blades they are pressed or screwed together, while the wire is heated by the electric current from a connected battery, removing in this way a portion of the shape and size of the blades' fenestra. This process can

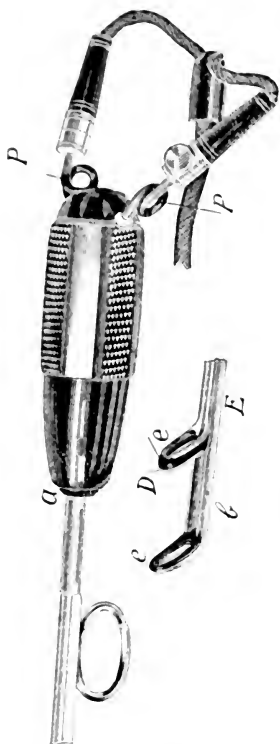


FIG. 16.—THE AUTHOR'S GALVANO CAUTERY PROSTATECTOME.

(a) Shaft, handle and connecting isolated wires.

(b) Distal or bladder end of instrument with its fenestrated blades.

(c, e) Rims of petrified wood of the shape and size of the fenestrae and fitted to them.

(d) Platinum wire loop resting upon e as an insulating surface, and passing in two separate and insulated wires through the hollow shaft E to connect with the battery wires P/P'.

be repeated until the entire obstruction has been eradicated, if desired. I have not yet had the opportunity to use this instrument on the living subject, but have tried it on living tissues bathed in moisture in dogs, where its work is quick and radical and absolutely bloodless.

The advantages of a burning instrument are, of course, the avoidance of hemorrhage and lessening of the chances of septic absorption. The disadvantage is thought to be the greater cicatrix resulting. Whether in this situation and under these circumstances such a result is serious, we do not as yet know. The instrument is offered simply as one among other means of accomplishing the end in view.

CONCLUSIONS.

Returning now to the consideration of the clinical evidence let us see what can be learned from that, and then end by inferring so far as may be from the study of the anatomical and clinical data combined :

1. The mortality of the radical operations is certainly not higher than that of the palliative ones.

2. Of the palliative operations, that of suprapubic puncture with retained cannula, is by far the most dangerous. Its danger lies in the likelihood of urinary infiltration, along the sides of the retained cannula, into the prevesical space, giving rise to septic phlegmon and peritonitis. Its bladder end is likely to become stopped either by the bladder wall or clots or debris. It is an operation to be condemned *in toto*, especially since it has been shown by Rohmer and others that a free suprapubic cystotomy with a large single or better double drain is safer and more efficacious.

The perineal drainage is safer than the above.

The criticism against all palliative means is that they do not remove or modify the pathological condition.

The mortality of the radical methods, though less than half as great as that of the palliative ones, is still high. But it must be remembered that we are dealing with old men, and with advanced forms of the disease with all that that implies. And also, and upon this point *especial stress should be laid, many more cases die from unskilful catheterization, than from any or all the radical operations performed by competent surgeons*, and these cases are constantly being subjected to such catheterization. And this I claim is more dangerous than any of the operations we have considered—(except perhaps suprapubic puncture and retained cannula.) It is not an easy matter in some instances to insert a catheter over an obstructing prostate to relieve for instance, an attack of retention of urine. A soft rubber instrument failing, the medical practitioner generally resorts to a silver one, which it must be confessed is frequently in anything but an aseptic condition. An obstruction is encountered in the prostatic urethra, the patient is anxious, and in pain—a too vigorous shove is given to the catheter, and the mischief is done—a false passage made, urine collects in it and decomposes, no free drainage is present, and the patient not infrequently dies directly from the effects of this thrust. Pathologists who make many post mortem examinations will I feel confident corroborate this view. I only repeat, in this digression, the oft reiterated teaching of others to assert that a radical operation well done may be less dangerous than ordinary catheterization badly done.

3. The evidence that has been presented is sufficient in quantity, and in character to not only justify but to demand operative interference, under the conditions already laid down as indications for such a step.

4. As the radical operations are not more dangerous than the palliative ones, they are generally to be preferred at the onset because they accomplish more. The exception to this rule should be when the exhaustion of the patient is already very great. Then a palliative operation may be done at first, and if the patient rallies and is willing, a radical one later.

Mercier's and Bottini's operations from the meatus are applicable to only a limited number of cases, namely, those in which the median obstruction has the form of a bar between the lateral lobes, or is but moderately developed into the so-called third lobe. And this condition must have been determined beforehand (by sounds, etc.,) not an easy matter. Drainage is not provided for by these methods, and their advantages over the perineal methods in which the exact state of the parts can be made out by the finger—are not apparent. They may therefore practically be ruled out, so far as most cases are concerned at any rate.

This leaves the perineal and the suprapubic methods to be considered.

Practically every variety of the disease can be reached and successfully treated by one or the other of these two routes. *Anatomically, two-thirds of all cases are operable from the perineum. Clinically the perineal operations are the safest.*

The natural conclusion from these facts is it seems to me this, namely: In any given case, open the membranous urethra and explore. Twice out of three times the operation may be completed by this (the safest) means.

In the other third of the cases a long perineal distance or a long salient growth will make the suprapubic method necessary. When this is the case and if there be at the same time a bladder capable of sufficient distention to allow of the employment of the modern technique in this operation, it may be proceeded to *at once*, if the patient's condition is good—later, (meanwhile draining by the perineum) if it is bad.

The one combination which would make both operations

impossible would be of course, a perineal distance so long as to put the median growth beyond reach—and at the same time a contracted bladder of small capacity.

How often this combination occurs I cannot say. It happens not to have been present in any of the cases examined by me. When it does occur, one would be obliged to rest content with perineal drainage only.

The method of tunnelling a median enlargement from the perineum, as practiced successfully by Mr. Harrison, does not seem to offer any advantages over a prostatotomy or prostatectomy, is less exact, carries the risk of injuring the bladder wall, and does not offer so good or so permanent drainage. Mr. Harrison seems also to prefer now the suprapubic or perineal prostatotomies or prostatectomies.

In connection with the perineal operations Mr. Harrison has advocated prolonged drainage (8-11 weeks or more) and experience certainly demonstrates the value of this procedure.

The details of technique of the various operations have hardly been touched upon. Decided improvements in this direction may be looked for in the future, and at this moment the author has wished only to establish the claim for surgical interference in certain cases of the disease, and to lay down the lines in which such action should be taken.

A CONTRIBUTION TO CEREBRAL SURGERY.

By JOHN KELLOCK BARTON, F. R. C. S. I.,

OF DUBLIN.

SENIOR SURGEON TO THE ADELAIDE HOSPITAL.

ALL CASES, which throw light upon the diagnosis of intra-cranial disease, are at present of great interest to the surgeon, for we stand ready, by the resources of our art, to save the patient who lies before us dying from the effects of pressure on his brain; but as we prepare to interfere, we stop, checked by the doubt which besets us, of the exact position of the enemy, whom we are able to dislodge could we but be certain where to find him. Soon—very soon, I hope—we shall be able to know the nature, and position of disease inside the cranium, as we do of that within the thorax, but just now all observations bearing on these two points, are invaluable. Hence I contribute two cases, one correctly diagnosed, and recovering, without operation, the other, diagnosed and the pressure removed by operation, giving immediate relief, and present recovery, but subsequently ending in death, resulting from inflammatory disorganization of the brain.

CASE I.—*Suppurative otitis, followed by cerebral symptoms, very severe pain, rigors, rapid changes of temperature, etc.; consultation, operation decided upon, if rigors returned, meantime treatment by mercury; patient recovered, without operation.*

Thomas Wallace, a watchmaker, 45 years of age, was admitted upon the 14th of January, 1888, to the Adelaide Hospital under my care. Mr., now Dr. Bell, acting as my dresser, took careful notes of the case, from which I extract the following particulars. He enjoyed good health until November, 1887; upon the 28th of that month he experienced a violent pain in his left ear, which continued for 3 days, when a dis-

charge of pus came from the ear and the pain at the same time was relieved. This discharge continued for 3 weeks, during which time, and ever since, he has suffered from what he supposes to be neuralgia, the original deep agonizing pain in the ear which preceded the bursting of the abscess, having disappeared.

This neuralgic pain affects the left side of his head, only; it begins at the occipital region, and seems to radiate across the side of his head to the frontal region; it as a rule becomes very violent about 3 to 5 o'clock in the afternoon, from which time it continues with unabated severity until 8 or 9 o'clock A. M., when patient falls asleep, and from this the pain abates until the next afternoon. He has remained in bed feeling unable to rise, or to do any work at his trade. Upon the 30th of November, before the abscess in his ear burst, he had a severe rigor, and this has recurred twice since that time, the last being on the day he was admitted to Hospital. He has no appetite, his tongue is loaded with a creamy fur, he has vomited twice during the course of this illness but felt no relief from this vomiting. Bowels somewhat confined. Ordered: Calomel gr. v., in powder, with a little sugar.

January 18th, he was ordered a mixture containing the bromides of sodium and potassium, the pains in his head continuing. A very careful examination was made of the left ear, from which there was now no discharge of any kind. The membrane was seen to be opaque and thickened.

On the 21st he had a very severe rigor, lasting 20 minutes, during which he not only shook the bed, but seemed as if he must shake himself out of it. His lips became livid and his extremities were very cold. The temperature had up to this varied very much, being sometimes 102° at night, and 99° in the morning. On this day after the rigor had passed off, the temperature rose to 104.6° .

Next day, 22nd., a consultation of all my colleagues, both physicians and surgeons, was held, and we unanimously came to the following conclusions. 1st. That the symptoms were due to inflammation of a portion of the temporo-sphenoidal lobe of the left side of the brain, due to extension of disease from the middle ear, of that side. 2nd. That the symptoms of

pressure were not sufficient to convince us, that as yet any formation of pus had taken place—but that; 3d, if a rigor, such as he had the day before, returned, the cranium should be opened to relieve tension, by the evacuation of pus—if it had formed—or of serum. 4th. That the situation where this opening should be made was sufficiently indicated by the extension of the inflammation from the petrous bone, and that the under surface of the temporo-sphenoidal lobe could be reached by trephining at a spot *two inches above and behind the external auditory meatus*.

The treatment which had been commenced was steadily continued. It consisted in blistering behind the ear; mercury by means of hyd. c. creta, in 2 grain doses, 3 times a day; morphia hypodermically, to relieve the nightly exacerbations of intense pain—with very light unstimulating food. There was no return of the rigor, and therefore no operation was performed, and the symptoms gradually gave way, so that on the 30th I find the following note: "Patient has not had much pain for the past 2 days; this morning he looked brighter than he has done for many days; appetite fairly good." Before the middle of February he left the Hospital quite free from any brain symptoms.

The diagnosis made in this case seems fully established by the subsequent course of the case. We doubted the existence of an abscess, and his recovery without operation makes the doubt a certainty. We believed there was inflammation of a certain limited portion of brain substance, and the fact that his symptoms gradually disappeared under treatment by mercury, renders the inflammatory nature of the disease almost certain.

I was ready to operate, but am thankful to my colleagues who kindly assisted me, for, strengthened by their opinion coinciding with my own that the existence of pus was not proved, I waited until the treatment by mercury had been fairly used, and the patient's complete recovery makes the case a highly instructive one.

CASE 2.—*Syphilitic Necrosis of Os Frontis; Signs of Cerebral Pressure; Removal of Necrosed Bone, by Trephining; Gummata discovered beneath the Dura Mater and removed with instant Re-*

lief; Partial Recovery; then Hernia Cerebri and death. Case noted by Mr. French.

Ellen Morrison, aged 30, a married woman, was admitted to the Adelaide Hospital in Sept., 1887, under the care of Dr. Wallace Beatty, at that time suffering from sickness of stomach. She left at Christmas, and was readmitted in Feb., 1888, with a swelling on her forehead. Dr. Beatty then asked me to see her, and I advised the swelling to be opened, being convinced that diseased bone lay behind, and further that syphilis was the poison producing all the symptoms; this diagnosis rested on the state of the mucous membrane of the pharynx and upon her skin, which showed the unmistakable spots and ulcers of a tubercular syphilide. The abscess on the forehead being opened, dead bone was found beneath it. As she suffered from headache, worse at night she was placed on 8 gr. doses of iodide of potassium, 3 times a day, with marked benefit. She left Hospital, attending occasionally until May, when she was again admitted this time into the "Brooke" Ward under my care, with the following group of symptoms: On the left side of the forehead there was an ulcer the size of a two-shilling piece, the base of which was formed of necrosed bone of a blackish color, perfectly bare and dry. She seemed to have constant pain in this region, but her naturally bright and intelligent manner was now quite gone, replaced by a dull lethargic manner and a confused and anxious look. When addressed she shook her head and made no reply, but pointed with her left hand to her right, which lay helpless by her side: the paralysis of the right side was not complete, for now and again she moved her leg and arm a little, then seemed to lose all power over that side, and similarly with her speech, usually she made no reply or attempt at speech—but the power returned sometimes, for a few minutes, and she spoke correctly: there was not *Aphasia*, but it seemed as if the power of framing her thoughts into words entirely failed her. Such was her state on the 5th of May,—on the 6th she was rather worse, the fœtid smell noted the day before was very marked about her head; she had taken no food except a little milk, apparently fearing the attempt to swallow. Considering the urgency of the symptoms, and the guide afforded by the necrosis of the

frontal bone, I decided to lose no time, but to open the cranium. Next morning, May 7th, the patient had passed a quiet night, had taken a cup of beef-tea early in the morning, had moved her right arm a little, and speech remained same as day before. At 10 A. M., she was placed under the influence of ether, and I proceeded to remove a circle of bone, about the size of a sixpence with a trephine. The bone through which I cut was partially dead. The osseous button being raised, the dura mater was seen to be of a dull yellow color, like wash-leather, and very tense. As there was not sufficient room properly to deal with the parts beneath, another circle of bone was removed, and even then, we had not room and a third was cut out. This gave an opening the size of a two-shilling piece, the bone which I removed being almost entirely necrosed. The tension on the dura mater caused it to bulge out through the opening, and felt with the tips of the fingers it gave a sensation of fluctuation as if it was distended by fluid. A crucial incision was now made through the dura, disclosing not fluid, but the characteristic deposit of a syphilitic gumma, a yellow cheesy, pulpy substance; this I at once began carefully to remove with a small scoop, and as I did so, Dr. Piele who was giving ether, felt the patient's right arm, move repeatedly; a very fetid smell was perceived by all who stood round the operating table.

It was difficult to remove all the gummatous matter, for it was soft and friable in itself, and was firmly adherent to the walls of the cavity, which it seemed to have hollowed for itself, by growth on the upper surface of the anterior lobe. The mass removed with the scoop when gathered together was the size of a small egg. When no more could be scraped away, the cavity in which it had been contained, was carefully and repeatedly washed out with a weak solution of sublimate 1 in 2,000, a drainage tube was placed in and the flaps of dura mater readjusted, and by a few stitches held in position; over this there was neither bone nor skin, so a light padding of sublimate gauze was placed over, and a bandage kept all neatly in place. The patient was then removed having been one hour in the operation theatre.

May 8th. Her condition was favorable; Temp. 99.8°. She

can move the right arm and leg feebly, but very much better than she could before the operation. Her speech shows a more marked improvement, for she answers clearly all questions, without hesitation or mistake, but there is an unmistakably fetid odor about her—the same as was experienced yesterday at the operation.

May 9th. Aspect very good; has no pain; wound was opened and dressed, as the fetid smell continued. The flaps of dura mater were sloughing, but the faëtor seemed to come from the decomposing gummy matter, which still clung to the membranes. After a very complete antiseptic irrigation, the cavity was dressed with charpie well soaked in Condie's solution of permanganate of potash 1 in ten.

May 10th. Patient slept well, feels and looks drowsy; breath foul; no pains in head. When the dressings were removed, the fetid smell was at once perceived; cavity well washed out, and drainage tube removed; charpie wetted in black wash was laid over the wound.

From this day until the 15th, she seemed just to hold on without any decided advance towards recovery—nor falling back either; upon that day (15th) it was noticed for the first time that there was a protrusion from the opening in the cranium—the protruding substance being cerebral, reddish in color, and very soft. The fact of the syphilitic origin of the case and of the probably inflammatory origin of the swelling of the brain substance, induced me now to make trial of 10 grain inunctions of mercurial ointment daily—more particularly as the irritable state of the bowels prevented the administration of mercury by the mouth.

She improved to a certain extent under this treatment, and during the succeeding fortnight frequently seemed as if she would recover—but towards the end of the month she began to refuse food, to become more drowsy, and upon the 2nd of June she died.

Autopsy (by Dr. H. T. Beuley): "Chief morbid change, acute inflammation of frontal lobe on left side, nearly amounting to abscess: on opening the cranium, the inner surface of the calvarium was found to be quite healthy, except at the seat of the trepan hole, where the inner side of the bone round the

edges was slightly disorganized. The dura mater had lost its characteristic shine, and was roughened for some distance around the trephine hole and was adherent to the brain matter: there was a slight lymphic deposit in and around the fissure of Sylvius, on the left of the wound under the dura mater there was evidence of acute inflammation, the brain matter being broken down almost to a state of abscess."

OBSERVATIONS ON CASE 2.—Cases in which the cranium has been trephined for a syphilitic lesion are as yet rare Syphilis in its later stages produces not only tumors of different degrees of hardness—some being (as in this case) soft, friable and decomposing; others hard, fibrous and firmly adherent—but also, is very apt at the same time to produce inflammatory changes in the membranes, hence a difficulty in deciding upon operation. Certainly a vigorous use of the iodide of potassium, and a cautious use of mercury must always in these cases precede operative interference, and will very generally relieve the symptoms so much as to make such unnecessary. In case 2, neither iodide of potassium nor mercury acted well, nor gave the same relief as is usually experienced. Hence the operation becomes necessary to arrest the advancing hemiplegia and aphasia, but the same insensibility to the beneficial effects of medicinal treatment which may be said to have made the operation a necessity, also rendered the ultimate result fatal, for undoubtedly had I been able to counteract the inflammatory changes which appeared on the 15th of May, my patient would have lived, for the immediate effect of the operation was successful and the autopsy shows that the principal morbid change, and presumably the cause of death, was "acute inflammation of the frontal lobe." I think I am justified in citing this case as a successful removal of a gummatous syphilitic tumor of the cerebrum by operation, and that surgeons may be encouraged to attempt the same under similar circumstances.

TUBERCULOSIS OF THE SACRO-ILIAC JOINT.— (CONTINUED).

By WELLER VAN HOOK, M.D.,

OF CHICAGO.

LEAVING it to be understood that the surgeon will use such constitutional measures as tonics, well-regulated diet, stimulants, etc., as will sustain the patient's vital forces in the presence of disease, we must first consider the treatment adapted to the local symptoms of the dry form.

The most important measure in the local treatment of joint tuberculosis is, as has been demonstrated in recent years, complete mechanical rest, allowing the diseased tissues an undisturbed opportunity to recover, as well as giving to the neighboring healthy tissues the most favorable chance to resist encroachment. In our discussion of the anatomy and physiology of the sacro-iliac joint, we have seen that since the load imposed upon the sacrum must be transmitted to the tuberosities of the ischia in the sitting posture, to the acetabula in the standing, the ilia and consequently also the sacro-iliac joints must be the media of transmission of force. Hence, without entering here into anatomical details, it is easily seen that, when the patient is sitting or standing erect, the joint tissues are not at rest.

By placing the patient upon the back and rigidly maintaining the recumbent position Hilton secured complete rest and succeeded in curing several patients. (See "Rest and Pain.")

Sayre seeks to attain the same result while allowing his patients to enjoy the advantages of out-door exercise. After a preliminary rest in bed for two or three weeks, the patient is placed on crutches with a high-heeled shoe on the sound side, and, since he believes also in the use of mechanical extension,

a heavy weight is placed in the heel of the shoe used on the affected side. It would seem that the movements of the dependent leg would unfavorably affect the diseased joint, and that in case the ligaments were diseased, extension upon them would favor the spread of tuberculosis. Sayre's results certainly disprove such an idea, rather leading us to conclude, that, if these disadvantages are real, they are more than counterbalanced by the advantages of fresh air and mental diversion and by the restraint placed upon the muscles controlling pelvic movements.

Extension upon the affected limb with the patient in the recumbent position was not practiced by Hilton. Prof. Sayre has used it with the very best results, chiefly in the early stages of systematic treatment. Afterward a number of his patients were allowed to use the high-heeled shoe and crutches during the day, while during the night the extension was replaced.

Hilton used in some of his cases a broad leather belt with straps and buckles so arranged that the belt could be readily tightened so as to support the pelvis as much as possible. The French have also used the belt to some extent. It seems especially useful in convalescence.

To secure rest in the recumbent position, Hilton in one case used a long splint. Some of the French surgeons, especially M. Verneuil, have used various forms of fixation apparatus including plaster of Paris casts.

Pain, a second indication is of course relieved in many cases by the application of rest. Counter-irritants should, however, be applied in the early stages in the form of frictions with liniments, painting with iodine or blistering with cantharides. The most useful counter-irritant seems to be the thermo-cautery. After its thorough application over the joint, Sayre found his patients relieved from pain and able to sleep at night. When soft boggy tumefactions make their appearance over the joint, indicating oedema of the para-articular tissues, the thermo-cautery has been very useful in hastening its removal.

The following table, No. III is an epitome of all the cases of sacro-iliac tuberculosis without abscess formation that I have been able to collect.

TABLE III.—CLINICAL HISTORY OF CASES WITHOUT ABSCESSES.

<i>No. — Observer. — Where pub- lished.</i>	<i>Age and Sex.</i>	<i>Occupation. — Dia- gnosis.—Deter- mining cause assigned.</i>	<i>SYMPTOMS. — Pain, Etc.— Lameness.—Changes in Attitude.—Tume- faction.</i>	<i>Treatment.</i>
23.—Larrey, These de Hattute, 1852 Delens. Right sacro-iliac dis- ease.	.....	Soldier. Jolting of caisson. Recov- ery.	When pain began it was in- termittent and moderate increased on pressure, on walking, on pressing to- gether the ilia. Standing painful. Gait free.	Rest and counter- irritation. Re- covery in three months.
24.—Same. R.s.i.d. Delens.	.....	Gunner. Caught cold 6 months ago. Recovery.	Persistent, tolerably sharp pain in hips. Pain exact- ly over s.i.j. Worse on walking, sitting, etc. Could not lie on that side Walk uncertain. Lame- ness. No tumor or fluctua- tion.	Counter-irritation. Girdle about hips.
25.—Observation of M. Chouppe First pub. by Delens. L.s.i.d.	16 F	No constitutional taint. Knee and hip sound. Spine sound. Observ. not concluded. None known.	Pain began in left leg, not well localized at first. Soon became continuous, and localized at knee. Worse on moving. Did not disappear with rest. Pain less when lying on right side. Tenderness over great trochanter and ilium, pain being felt in s.i.j. Also pressure over sacrum gives same. Swel- ling, with sense of deep bogginess. Abscess re- vealed neither externally nor by rectum. Walks with a limp.	
26.—Observation of Berger Flint, pub. by Delens. S.i.d. double.	25 F	Some scrofulous symptoms in childhood. Has 3 children, last af- ter difficult labor. Hips sound. Polyarthritis rheu- matica. Had a se- vere fall on but- tocks during last pregnancy.	Pain began after the fall and she could only walk with difficulty. After 18 months had to keep her bed. Pains over a year in left hip, especially in walking and making pres- sure. Pains then radiated to side of arms. Can not sit up without great pain in both sacral regions. Most pain in anal fold. Patient seemed forced in- to her pelvis.	
27.—M. Denis, first pub. by Delens. L.s.i.d.	36 M	Ship-painter. Fall from height. Incom- plete.	No abscess. First noticed pain in left buttock. Pain around s.i.j. worse. Pain also in internal iliac fossa. Prominence at upper part of left hip. Bogginess about left s.i.j., which disappeared once, but re- turned in 7th month of his stay in hospital. Bogg- iness seemed from other symptoms to terminate in an abscess.	

<i>No. — Observer — Where pub- lished.</i>	<i>Age and Sex.</i>	<i>Occupation. — Dia- gnosis — Deter- mining cause assigned</i>	<i>SYMPTOMS. — Pain, Etc — Lameness. — Changes in Attitude — Tume- faction</i>	<i>Treatment.</i>
28 — Hilton, Rest and Pain, p. 245 R & I d.	.....	Boy, "Gentleman" Trauma. Fell down two stairs. Remark — Argues that sciatic nerve was somehow af- fected.	Pain in right leg below knee. Very great. Hy- peresthesia over calf, both superficially and deeply. Much tenderness over s.i. j. At first he walked with a limp, foot slightly in- verted. After some ten months worse and could not walk. Thigh slightly flexed. Pain on straighten- ing. No swelling men- tioned.	Complete rest. Re- covery. Duration, about 20 months.
29 — Hilton, p. 248	5 M Fall. Recovery.		Pain caused by pressure over s.i.j. or on approxi- mation of ilium and si- crum, or by pressing sac- rum forward. Lameness began soon after fall, and became progressively worse till he could not sit, walk, or stand. Left thigh a little flexed. No swel- ling mentioned.	As above. Recov- ery. Duration, about 5 months.
— Hilton, p. 240. R & I d.	42 M	Car-man. Possible strain.	Pain in hip at first light and intermittent became con- stant and severe. Lifting weights caused much pain. Most pain over s.i. j., also tenderness. Press- ing ilia together so as to disturb s.i.j. caused in- tense pain. Sense of yield- ing in back on standing. Could not lie on right side. Walking too painful to be practiced. No swelling mentioned. Remark: Hil- ton believes this case re- sulted in ankylosis	Rest for 6 months. Duration, 1 year.
31 — Chas. T. Peere, Am Jour. Med. Sci., Jan 1873 L & I d.	4 F	Good constitution. Not mentioned. Incomplete.	Four weeks after lameness noticed pain in left knee. Movements of s.i.j. pain- ful. Tender. Lameness first symptom noticed. No swelling till 7 months.	By extension and plaster of Paris splint.
32 — A. Bonnaix, These de Paris, 1874 R & I d.	36 M	Soldier. Lying in trench. Morb. Cox. with s.i.d. The diagnosis was not made during life. The autopsy showed softening the cartilages, and incipient destruc- tion was present. No pus in sacro- iliac joint.	Pain in loins running down leg to great trochanter and then to knee. A little hogginess at great tro- chanter, seat of intoler- able pain, 4 months after onset of abscess. Abscess at level of great trochanter aspirated 4 months after entered hospital. Again in one month and subse- quently 4 times, till sponta- neous opening occurred 3 months later. This was closed with collodion, though the pus was foetid. Drained 7 weeks later. Patient soon died.	Duration of disease about one year

<i>No. — Observer. — Where pub- lished.</i>	<i>Age and Sex.</i>	<i>Occupation. — Dia- gnosis. — Deter- mining cause assigned.</i>	<i>SYMPTOMS. — Pain, Etc. — Lameness. — Changes in Attitude. — Tume- faction.</i>	<i>Treatment.</i>
32.—Prof. Sayre, hitherto unpub- lished, 1874. R. s.i.d.	30 M	Student. Trauma.	Symptoms had been mis- taken for those of morbus coxarius till Prof. Sayre made the diagnosis.	Counter-irritation, by means of the actual cautery, ex- tension at night and in daytime exercise on crutches with high shoe on left foot and weighted shoe on right. Re- covery complete in 6 months.
33.—Prof. Sayre, hitherto unpub- lished, 1866. R. s.i.d.	5 M	Delicate constitu- tion. Fall from hobby-horse.	Began in a few weeks to suffer pain in right knee.	Actual cautery and finally wheel crutch with high boot on well side and weight on the diseased limb. Recovery in eigh- teen months.
34.—Prof. Sayre, hitherto unpub- lished, 1867.	23 F	Injury by falling upon s.i.j.	Patient had been treated for hip-joint disease.	Actual cautery. Rest in bed with exten- sion for 6 months, then high shoe on well side with crutches and a weight on the diseased side. Re- covery in 18 months.
35.—Prof. Sayre, hitherto unpub- lished, 1866. L. s.i.d.	13 M	Injury by jumping from a height and striking left heel.	Pain in left limb followed immediately after the in- jury was received. Limb became apparently longer and he had some pain at night.	Actual cautery; rest; extension. Recov- ery in two years.
36.—Prof. Sayre, hitherto unpub- lished, 1866.	11 M	Injury to s.i.j. by striking back against piece of wood in swinging.	Great pain and partial pa- ralysis of lower extremi- ties followed. Disease is of two years standing.	Actual cautery; ex- tension in bed, then high shoe and weight. Re- covery in 18 months.
37.—Prof. Sayre, hitherto unpub- lished, 1863. L. s.i.d.	61 F	Cause unknown.	In Feb. 1857, was seized with pain in lumbar re- gion and was confined to bed for six years. Left thigh $1\frac{1}{2}$ inches smaller than right, and a little longer. Great and con- stant pain in left calf.	Actual cautery; ex- tension in bed for several months. In July, 1868, was perfectly well, do- ing housework, but left limb not quite as large as the other.
38.—Prof. Sayre, hitherto unpub- lished, R. s.i.d. May, 1877.	8 M	School-boy. Fell from horizontal bar.	Was treated for hip-joint disease.	Actual cautery; weight and pulley extension in bed for two months, then wheel crutch with high shoe on well side and lead in heel of boot on lame side. Recov- ered after eight months. Duration 20 months.

<i>No. — Observer — Where pub- lished.</i>	<i>Age Sex.</i>	<i>Occupation — Dia- gnosis — Determ- ining cause assigned.</i>	<i>SYMPTOMS — Pain, Etc. — Tenderness — Changes in Attitude — Limb- faction.</i>	<i>Treatment.</i>
32.—Prof. Sayre, hitherto unpub- lished, R. S. J. d. March, 1881	4 M	Family and personal history good. No history of trauma- tion given.	Began six months before he was seen by Prof. Sayre, March 15, 1881, with pain in the hip and back. Had spasms in the calves of his legs. Treated at first for rheumatism, till he was sent to Prof. Sayre for treatment for hip joint disease. At first it was thought the hip was af- fected, but on second ex- amination the hip-joint was found not involved. "This was evidenced," says Prof. Sayre, "by the increased temperature over the sacro-iliac junc- tion shown by the use of Seguin's surface ther- mometer."	A blister was ap- plied over the sac- ro-iliac synchond- rosis and was twice repeated. After 3 months actual cautery. In two months more wheelcrutch with extension on right limb by lead in the heel of the shoe. Recovery after 12 months of treatment
43.—Prof. Sayre, hitherto unpub- lished, March, 12, '81, L. & J. d.	12 M	Family and personal history excellent. May, '80, crushed against the side of a stall by an ox that he was "hooking up."	Patient fainted immediately after the injury was re- ceived and had more or less pain afterward, espe- cially on exercising much. Was confined to bed for a week, then resumed work till a few weeks before seen by Prof. Sayre.	Put to bed with weight and pulley and actual cautery used freely and deeply. Re- mained thus in bed two months. Then put on high shoe on well side and two pounds of lead in shoe of diseased side. Ex- tension continued at night 4 months longer. Then re- turned home en- tirely well.
45.—Prof. Sayre, hitherto unpub- lished, R. S. J. d.	38 M	Preacher. Previous health excellent. Wrenched back by a heavy fall in 1884	Patient was treated for rheumatism and sciatica. Was repeatedly canter- ized over the sciatic nerve and down to the knee. Finally the sciatic nerve was stretched by Dr. H.	After sacro-iliac tu- berculosis was di- agnosed was a high boot on sound side, with long crutches, the lame leg to swing clear. Some re- lief, but could not sleep. In July, '85, he was seen by Prof. Sayre, who used the actual cautery very deeply and put him to bed with night extension for 2 weeks. He then resumed crutches and shoes the right one weighted with 1½ pounds of lead. In May, '86, was in perfect health except feeling un- well on Monday, on account of Sunday's work.

<i>No. — Observer. — Where pub- lished.</i>	<i>Age and Sex.</i>	<i>Occupation — Dia- gnosis.—Determ- ining cause assigned.</i>	<i>SYMPTOMS. — Pain, Etc. — Lameness.—Changes in Attitude.—Tume- faction.</i>	<i>Treatment.</i>
42.—Prof. Sayre, hitherto unpub- lished, Oct. 23, 1885.	12 F	Previous health good. Parents healthy. Fell from a swing, striking on her bottom 2 years ago.	Complained of pain which she thought was in the hip. Treated five months before being sent to Prof. Sayre. The hip was ex- cluded from implication by the facts that was no pain on moving it when the pelvis was fixed. There was also no eleva- tion of temperature over it. Over s.i.j. temp. was elevated. Movements in- volving the s.i.j. caused pain.	Consisted in Prof. Sayre's hands, in free application of the actual cautery over the s.i. joint and weight and pulley, ex- tension in bed for 3 months. Was then put on crutches with high heel on the well side and 2 pounds of lead in the shoe of the diseased side. Recovery after 4 months.

The cases of Prof. Sayre, in which abscess formation did not occur have not been heretofore published and were thus kindly communicated to the writer.

CASE 32. (The numbers correspond to the notation of cases in the tables). May 15, 1874, I. H. R., æt. thirty, Philipsburg, N.J., medical student at Ann Arbor, injured Feb., 1873, treated for disease of hip for more than a year without relief. I found no disease of hip but disease of right sacro-iliac joint. I applied actual cautery over the seat of the disease and extension at night by weight and pulley; while in the day time exercise on crutches, with lead in the heel of the right to increase extension by night, and a high shoe on left side. Actual cautery was applied three times in four months, and in six months the cure was perfect.

CASE 33. S. I. L., Milwaukee, æt. five, always delicate, came to me July 7, 1866, had a fall in Oct. 1865 from a hobby-horse. In a few weeks had a pain in the right knee. This was painted with iodine and he was afterward treated for hip-disease. As he did not improve he was sent to me to be treated for hip-disease. Careful inspection decided the knee and hip both to be well but the disease was in the right sacro-iliac junction. Extension. Actual cautery and wheel crutch with high boot on the well side and weight on the diseased limb resulted in the patient's recovery in about 18 months.

CASE 34. June, 1867, Mrs. I. L. B., æt. 23, Franklin, N. S., fell in 1866, striking on sacro-iliac synchrosis, sent to me in June, 1867, for hip-disease by Dr. Linn. Hip-joint sound, but sacro-iliac disease. Actual cautery, rest in bed and extension for six months, then high

shoe on the well side with the crutches and weight in shoe of diseased side. Recovery perfect in about eighteen months.

CASE 35. T. H., æt. thirteen, Louisville, Ky., came to me Aug. 15, 1866, for hip-disease of eighteen months standing, caused as he thought by jumping from a height and striking on his left heel, as the pain in the whole limb followed immediately. The limb soon became apparently longer and he had some nocturnal pains. Careful examination excluded hip-disease and revealed sacro-iliac trouble. Rest, extension, actual cautery, recovery in two years.

CASE 36. June, 1868, F. A., æt. 11, Tarrytown, N. Y. In Aug. 1886, while swinging struck his back against a projecting piece of wood in piazza. Great pain and partial paralysis of both extremities. He was sent to me for hip-disease, but there was none, but sacro-iliac disease instead. Treatment, hot iron, then for two years, extension in bed, finally, a high shoe and weight. Recovery in eighteen months.

CASE 37. Mrs. M., æt. 61, Newton, L. I. in Feb. 1857, seized with pain in lumbar region without known cause, and confined to bed for the past 6 years. I saw her in July, 1863, unable to leave the bed. Left thigh was smaller than the right and a little longer. Great and constant pain in left calf, sacro-iliac disease on left side. August 7, 1863, actual cautery in sacro-iliac joint. Confined to bed with extension for several months. July 6, perfectly well, doing housework, but left thigh not quite as large as the other.

CASE 38. J. F., of Minnesota, aged 8 years, brought to me May 30, 1877. He had fallen from a horizontal bar in a gymnasium in the summer of 1866, striking his right hip and back. In October he became so bad that Dr. Todd Helmuth treated him for hip-disease for some months. When brought to me, in May, 1877, he had sacro-iliac disease of the right side. Actual cautery, weight and extension in bed two months, then wheel-crutch with high shoe on the well side and lead in the heel of the lame foot. August 27, parents with boy called at the office as they were in the city. He was in perfect health, and had not used the crutch since last December.

CASE 39. March 15, 1881. C. H., æt. four years, from Carson City, Nevada, of healthy parents, four other children, all healthy. This boy always well until six months before, when he complained of pain in the hips and back, spasms in the calves of his legs, etc. He was treated for rheumatism, then sent to me for hip-disease, and at first I thought that was his trouble. Put him to bed with weight and pulley and blister behind trochanter. On March 24, by a more careful examination I located the disease in the right sacro-iliac junction, the hip-

joint proper not being involved, as evidenced by the increased temperature on the sacro-iliac junction, shown by the aid of Seguin's surface thermometer. A blister was applied on sacro-iliac synchondrosis and extension in bed continued. After a second repetition of the blister, at the end of three months the actual cautery was applied, and in two months the patient was put on a wheel crutch with extension on right limb by lead in heel of shoe. Continued on wheel crutch until the following March, when he was entirely well, after about twelve months under treatment.

CASE 40. March 12, 1881. W. B. æt. 19, sent to me by Dr. Hunter McGuire, of Richmond, on March 12, 1881, to be treated for hip-disease. He had always been a strong and healthy boy, and was one of nine children, all healthy, as were their parents. Careful examination excluded the hip, but revealed disease of the left sacro-iliac junction. The young man then remembered that in May, 1880, while attempting to "hook up" a pair of steers in the stable one of them attempted to turn around in the narrow stall, crushing him against the side of the stall. He fainted at the time, and had suffered more or less pain ever since, upon taking much exercise. He was confined to his bed at the time of the accident about a week, but has never been entirely free from pain. Some weeks ago he had become so much worse that he gave up work, and went to Dr. McGuire, of Richmond, who sent him to me. He was put to bed with weight and pulley, and actual cautery applied freely and quite deeply over the left sacro-iliac junction. Remained in bed with extension two months, then wore a high shoe on the well side with long crutches and two lbs. of lead in the shoe of the diseased side. Walked on crutches during the day and extension continued at night for four months longer, when he returned home entirely well.

CASE 41. Rev. T. H. K., æt. 38 years, remarkably strong and healthy, fell eight or ten feet from a platform which gave way in Virginia, 1884, striking, he thinks, on his feet. When he was taken from the wreck he found his back was terribly wrenched, and he was bruised on his right leg, his right shoe being torn from his foot. His brother, who is a physician, gave him some liniment to rub with, and in a few weeks he returned to Brooklyn, and resumed his work as preacher. In January, 1885, he was sent to Hot Springs for rheumatism and sciatica, where he remained three months, being repeatedly cauterized on the sciatic nerve and down to the knee.

Returning in March, he saw a distinguished New York physician, who thought him "In for a long seige and a probable cripple for life."

He then saw Drs. R. and H., who suggested stretching the sciatic nerve, which was done though not bringing relief. Dr. H. then said it was sacro-iliac trouble and advised the high boot on the well side with crutches, and lame leg to swing clear. This gave some relief, but he was still unable to sleep. (No extension was used at night). He then saw Dr. L. again in consultation with two well known surgeons, the two latter thinking it was deep seated inflammation of the sheaths of the nerves, and advised three months confinement in bed, or on a reclining chair. However, he adhered to the suggestion to use the high shoe and crutches, swinging the lame leg. He went to Baltimore to see Dr. Adam Smith, who said it was sacro iliac disease, and advised him to continue the shoe and crutch treatment. He then went again to Texas to see his brother, who is a graduate of Bellevue and he confirmed the diagnosis of sacro-iliac disease, and brought him to me July, 9, 1885. On stripping him he presented the appearance of a remarkably robust and healthy man, with no predisposition to any disease. His position was remarkably characteristic of sacro-iliac trouble, as seen in the protograph taken at the time. (See Fig. 1, ANNALS OF SURGERY, vol. viii, p. 422.) I applied the actual cautery very deeply, about four inches long in a curved line around the right sacro-iliac junction. Put him to bed with weight extension for two weeks; then he resumed his crutches, with heel on well side and an extra weight of a pound and a half on the right shoe. November 21, 1885, very greatly improved in every way, nearly as straight. May 3, 1886, has continued to improve, feels perfectly well except on Mondays, which he attributes to too much work, preaching twice on Sundays, and was ordered to diminish his work. July 1, he came to the office without crutches or high heeled shoe, said he was perfectly well and much straighter, if not perfectly straight. He had no time to have a photograph taken, but promises to send me one from his home in the west, for which he leaves to-day.

CASE 42. Miss I. H., æt. 12, years, Atlanta, Ga. Remarkably strong and healthy child of healthy parents. "Fell from a swing, striking her bottom, two years ago," and has been complaining ever since. About one year ago complained of pain, but could not locate it accurately, thought it was in her hip. Was afterwards seen by Dr. Westmoreland, who, after treating her some months, sent her to me. He had put her on crutches, with a weight to the lame limb, but had not put a high heel on the opposite side, so the limb was apparently shorter. This apparent shortening was caused by the flexion of the thigh on account of the contraction of the *psoas magnus* and *iliacus*

muscles. Her deformity was peculiarly characteristic of sacro-iliac disease. When the psoas magnus and iliacus are put on the stretch it causes great pain. The trunk is twisted to the left. Increased heat over the sacro-iliac junction of the right side by Seguin's thermometer. Pressure on the right sacro-iliac junction causes intense pain, not on the left. When the pelvis is pressed downward firmly the thigh can be pressed upward without pain, but when the downward pressure is removed from the ilium, pressure of the thigh upward causes great pain, showing the disease to be at the sacro-iliac joint, and not at the hip joint. Motions of the hip-joint are also quite free as long as the pelvis is held quite still, but as soon as the pelvis is not held, motion of the limb causes great pain because the motion is transmitted to the sacro-iliac junction. I put her under chloroform and applied the actual cautery very freely along the sacro-iliac junction, making quite a deep burn. She was put in bed with weight extension for three months, then put on crutches with high heel on the well side and two pounds of lead in shoe of sick side. Treatment continued four months, when she returned to Atlanta in perfect health, walking without pain, and almost perfectly straight, as seen in the photograph by R. H. S., taken March 27, 1886."

The indications for treatment are so clear and the results of Prof. Sayre and Mr. Hilton are so conclusive that the reader will have no difficulty in determining from a study of their work the measures that should be adopted in those cases which, showing a tendency to dry granulation, offer hope of recovery without radical operation. Assuming that the disease has been recognized in its early stages; that careful examination over the joint, in the lumbar region, about the trochanters and anterior surface of the thigh, in the iliac fossa, by the rectum, and, in the female, by the vagina, has determined the absence of fluctuation due to cold abscesses, the patient should, of course, be placed under the best hygienic conditions that circumstances will admit. The surgeon will naturally make all possible enquiries into the state of the functions of the vital organs and, if necessary, will administer digestants, stimulants, tonics, etc. If pain exists, if cedematous swelling and tenderness are found or if the disease has already existed for some time, experience teaches that the application of the thermo-cautery should be made under anæsthesia. The

depth and character of the articulation, and the chronicity and sluggishness of the disease warrant a degree of thoroughness here that in other joints would be unjustifiable. The variety and scope of these indications is such that the majority of the cases encountered will be included. But if abscesses have not formed and if strict antiseptic rules are followed out in the treatment of the wound made, there will be but little if any danger to be encountered and the reaction will be almost invariably beneficial.

The patient should at first be placed in bed. If the cautery has been used he will naturally assume the lateral decubitus and the weight and pulley extension cannot be used. But as soon as the wound is healed it should be applied, with the object of reducing muscular action to the minimum and of keeping the bones of the lower extremities in a uniform position with reference to the trunk.

At the discretion of the surgeon, following the experience of Sayre, it is admissible to allow the patient to use crutches and an elevated shoe on the sound side with a weightier shoe on the diseased side. This is especially desirable when the patient finds confinement irksome, loses appetite and weight, and is obviously in need of some degree of activity and of "fresh air." For a considerable time during the earlier course of treatment the extension should be applied at night; indeed it should be removed during the day only when the patient's progress is unquestionably favorable.

The writer believes that a more extended application of the broad pelvic girdle might advantageously be made during the later stage of recovery, especially when the patient begins to lay aside his crutches and his specially constructed shoes. It is then that the support of the belt gives most comfort, favors contraction of the cicatrices about the joint and gives a sense of security to the weakened pelvic circle.

Finally, it should not be forgotten that encapsulated tubercle bacilli may here as elsewhere be set free by traumas, and may cause a repetition of the original symptoms of tuberculosis. The patient should be forewarned of the possible consequences of violence, so that, in case of relapse, he may promptly submit himself to treatment.

TABLE IV.—CLINICAL HISTORY OF CASES WITH ABSCESSES.

No. — Observer — Where pub- lished.	Age and Sex.	Occupation — Dia- gnosis—Determ- ining cause assigned.	SYMPTOMS — Pain, Etc. — Lameness—Changes in Attitude—Tume- faction.	ABSCESS — Appearance—Discharge —Suppuration —Healtb.
43.—Girauld de Nol- hac, These de Paris, 1830, De- lens. l. s. i. d.	35 F	Laundress. Lym- phatic tempera- ment. Sudden cracking on mounting ladder with burden. Re- marks: Diagnosis made by Velpeau. Patient left hospi- tal.	At first intermittent pain in loins, two months later this pain replaced by one from buttock to left knee. All pains ceased when first abscess formed. Walking impossible. Patient lies on right side. Can't lie on left.	After six months 1st abscess, at external and lower part of left but- tock opened, 2 weeks later 2d abscess, be- low and to left of spine opened. Appetite retained. Pulse regular, slow.
44.—Girauld de Nol- hac, These de Paris, 1740, De- lens. l. s. i. d.	45 M	Brushmaker. Previ- ous health good. None could be found.	Began with pains vague and intermittent at first then persistent. Knee be- gan to be flexed probably 3 or 4 months after onset. Walking impossible with- out cane. Could not lie on left side.	5 or 6 months 1st. at superior part left border of sa- crum opened, thin watery fluid. Soon after two more, one below No. 1., the other on pos- terior face of middle part of thigh. Both punctured. White grumous imper- fectly mixed ma- terial. Appetite retained. Emacia- tion. Remarks: Treatment by counter-irritation, till abscess form- ed. Observer thought ischium was a little dis- placed outwardly.
45.—Joyeux, These de Strasburg, 1842, Delens, Left side. Se- questra.	F	Forceps delivery still-born child. 2d cracking sound and sharp pain. 1829, 3d child 1839 4th child. Pains in left hip behind. 1832, new preg- nancy with pains in s. i. j. 1833. 6th accouchment nor- mal. Patient left hospital in des- pair. Note — Though strictly only one abscess, it pointed post- and opened into rectum.	After fourth labor new pains. After evacuation much re- lief. During sixth preg- nancy suffered pain in s. i. j. from fifth month on. After delivery third day lancinating pain. After third month sensibility al- most lost in left leg. Pains severe after third month. Could not walk for two months after delivery. Af- ter fourth labor decubitus on left side impossible. Third month after sixth, patient thinks she feels friction. Swelling over s. i. j. immediately after 4th labor. Swelling increased. 23d day after labor fluctu- ating fever. After fourth delivery thigh and leg flexed. Could extend limb after evacuation.	Rapidly forms after 4th labor. Tumor disappeared after pus was evacua- ted. Pus very fetid. Two months after fourth labor much pus by rec- tum. Curdy pus passed after 24th day. 40th day quantity dimin- ished, 50th day much pus almost emitted tumor, 100th day passes fragment of bone. Subsequently two more pieces at dif. times. Also others later.

No.	Series.	Age and Sex.	Occupation and Cause assigned.	Diagnosis—Terms.	Symptoms.—Pain, Etc.—Lameness—Changes in Attitude—Tumefaction.	Abscess—Appearance—Discharge—Healing.
10	—Observe of Dr. W. H. C. Jones, Thesis of Hattute, Paris, 1892, De cns. R 51 d.	25 M	Merchant. Rheum- syphilis. A vanced —pulmonary phthisis. Circum- stance is mention- ed of his having had rubella, but not as a determin- ing cause.		Periodical pain in right thigh at night. After five months became fixed. Now has deep pain from r. post. sup. spine to s.i.j. thence to post. inf. part of coxa. Pain on pressure sharp. Also when ita are pressed together. After 5 months lameness began. Sharp pain if he puts foot on ground. He drags limb in walking. On standing point of foot is directed forward to prevent falling.	5 months after pain became fixed, fluctuant tumor appeared at level of s.i.j. Opened with caustic 3 months after beginning of suppuration. Patient died of hectic.
11	—Observe of Dr. Larrey, Thesis of Hattute, Paris, 1892, De cns. R 51 d.	5 M	Soldier. Tuberculo- sis. Severe bow; fell down stairs. After two years (from trauma) cold abscess in front of sternum.		Pain after fall returned ir- regularly. After 2 years pain worse. After 2 years could not stand. Lies on left side. After 2 years swelling in trochanter.	Abscess two years and four months after trauma. Opened, 200 gms. pus. Curdy, 2d opening and drained later, 3d opening formed spontaneously over s.i.j. On opening 3d ab- scess found de- nudation of bone, and abnormal mobility of sa- crum and ilium. Discharge lasted two months when patient died.
12	—Observe of Dr. Weiss, Thesis of Hattute, Paris, 1892, De cns. Phthisis.	24 M	Infantry man. Lymphatic tem- perament. Oede- ma of legs began after abscess in- opened spontane- ously. Then soon engorgement in r. t. fossa.		Abscess already formed. Slight pain only at s.i.j.	Two months limited abscess over s.i.j. Punctured open- ing closed. Soon opened again by itself. Curdy, foetid and abundant. Hectic and obsti- nate diarrhoea. Death 7 months from beginning of suppuration.
13	—Observe of Gouraud, These de Bissane, 1892, De cns. Death, Autopsy. I 51 d.	16 F	Seamstress. None known.		Pain in left s.i.j. worse in 6 four months. Swelling be- gan after four months.	6 months after it was first noticed ab- scess burst. Opened more freely. Point of necrosis at post. inf. spine. Injections of io- dine. Foetid and abundant. Died of "marasmus" Feb. 23. Autopsy.
14	—Observe of Gaffard, These de la Societe Anat. 1894, I, 51 d. De cns. Death, Autopsy.	27 F	Laundress. Chloro- sis marked. None given. Hip-joint found under anesthesia to be sound. Diagnosis after death.		Pain first felt in left hip. Soon pain extended to knee. 13 months tend- erness in region of hip at edge of great trochanter at anal fold at knee. Lameness caused by pain. Could no longer walk. No tumefaction noticed. Atrophy of whole limb.	Abscess not noticed till post-mortem. See path. Anat. Treatment by rest and counter-irri- tation. Later placed in immovable apparatus for a while.

No. — Observer — Where published.	Age and Sex.	Occupation — Dia- gnosis — Deter- mining cause assigned.	SYMPTOMS — Pain, Etc. — Lameness — Changes in Attitude — Tume- faction.	ABSCESS — Appear- ance — Discharge — Suppuration — Health.
46.—Observ. of M. Carre, pub. first by Deleens. L. s.i.d.	36 F	Negress. Some signs of phthisis. Hip sound. Un- finished observa- tion.	Leans on rig t limb, hence pelvis is deviated in that direction.	For four months had swelling in l. iliac fossa. Fluctuant. Now size of an orange. Punctur- ed twice. Each time 150 gms. pus. Refills.
43.—Bulletin de la Societe Anat. 858, p. 221. R. s.i.d. Deleens.	30 M	Joiner. Patient died of exhaustion from pain and suppuration.	Began with dull pain in s. i. region. Sciatica in same limb. Neuralgia became unbearable. Analogous pains in left leg.	Eleven months after beginning abscess over right but- tock. Punctured. 200 gms. non-fec- tid pus. Iodized injections gave extreme pain.
47.—Hilton, Rest and Pain, p. 250. L. s.i.d. Rec.	24 F	Lady. Parturition.	Began with pain suddenly in left hip on moving in bed. Not at first severe, but gradually increased. Pressing together ilia and pressing over s.i.j. caus- ed much pain. Lameness began also. Could not walk or stand. Reclined on right side. Thigh a lit- tle bent.	Seven weeks after parturition abs- cess was detect- ed by rectal ex- amination. Pres- sure upon it gave pain in s.i.j. Abs- cess disappeared in two years. No pus passed by rec- tum. Rest com- plete, with pelvic belt. Recovery in two years.
48.—C. Heath, Clin- ical Lecture, Brit. Med. Jour. 1876, vol. ii, p. 781. L. s.i.d. Incomplete.	.....	While going up stairs sudden pain.	Pain at first intermittent, became better, then be- gan again and became continuous. Lay on right side with left hip flexed at right angle. At end of six months slight swelling over s.i.j. ovoid and regu- lar.	This swelling fluct- uates and gives a distinct impulse on coughing. A second swelling soon communi- cates with first. Patient very thin. Aspirated several times. Patient improved and left hospital. Belt used.
49.—C. Heath, Clin. Lect. Brit Med. Jour. 1876, p. 781. L. s.i.d. Incomplete.			Beginning not recorded. At time of tumor, cutting pain over abdomen and down thigh. No tender- ness over s.i.j. Cutting pain in s.i.j. on step- ping on floor. Hard, non- fluctuant tumor left il. fossa.	Outside this swell- ing a fluctuant tumor noticed one month later. A.p. 7½ oz. 2 months later, asp. 8½ oz. Just inside ant. sup. iliac spine swelling size of pigeon's egg, fluctuant, tense on extending, and relaxed in flexing thigh. By pres- sure in il. fossa, abscess made tense. Starting pains. At last ab- scess broke into rectum. No gas in abscess.

No.	Age— Where born— Date	Sex	Occupation— Education— Previous disease— Cause assigned	Site—Symptoms— Lameness— Changes in Attitude— Change Position	Progress— Appearance— Discharge— Suppuration— Health
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50	Heath, Asa Nov. 1, 1874	Male	Unmarried Army	No In- jury	For six months pain in left groin and across loins. Greatest toward evening, three months ago swelling inside left thigh and down leg	Fulness and fluctua- tion above Pou- part's lig. and outside the line of the vessels with distinct fluctua- tion transmitted to below Pou- part's lig. Asp. 302
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51	C. L. Pore, Am. J. of Med. Sci. Jan. 1875 F. 114	Male	No Injury		Pain in right hip which in- creased. No pain lying down. 6 months later pain on approx. ilia and on pressing over s.t. Thigh flexed only after 6 months. Cannot be extended more than right angle.	6 months later right hip bulged out forming curve be- ginning at lower ribs, with great- est convexity just below crest of ilium. Abscess aspirated several times. Then free incision, two ab- scesses, one a- bove the other be- low gluteal mus- cles, only outside one reached by aspiration. Swel- ling above crest of ilium. Impulse communicated to gluteal abscess in coughing or cry- ing. Abscess a- bove ilium open- ed. The two con- nected, as proved by injected water. Dead bone found. Patient was re- moved from hos- pital.
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52	A. L. Pore, These, F. 114 1874. F. 114 Phthisis, p. 114 Death, A. 114	Male	Soldier. No In- jury. Exp. sure in campaign of 1870.		Pain in right leg since cam- paign. Improved. After absent 1 year, much pain in thigh and hip, without abdominal pain or swell- ing. Then sharp pain on pressure at border of great trochanter. No tenderness in vertebral region, anal or sacral. Walking and sitting painful at begin- ning. Pains shoot down to knee. Patient still walks. Pain on leaning or trying to lift a load; punc- ture with trocar. Patient lies on left side with thigh flexed.	After about 1 year patient entered hospital with fluctuating swell- ing in right gluta- l region, be- tween sacrum and great trochanter. Puncture with tro- car. Nearly a li- ter of pus. Some days later drain- ed. Phlegmasia alba dolens in left leg. 2 months before death. Pa- tient dies of phthisis and diar- rhea. Duration of disease about 20 months.
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No. — Observer —	Age	Occupation —	Diagnosis —	Symptoms —	Pain, Etc. —	Abscess —	Appearance —
Where published.	Sex.	and thesis—Determining cause assigned.	Lameness—Changes in Attitude—Tumefaction.	Discharge—Suppuration—Health.			

15.—Same. L. s. i. d. Death. Autopsy.	23 M	Soldier. Pegan after a bath in the Seine.	Began with deep sharp pain worst on rising or lifting burden. This lasted eight months. Tenderness over s. i. j. and over tumefaction. Tumor noticed in lumbar region.	Fluctuation detected soon after. Aspirated, then drained. Seven months later 2d abscess opened over post. inf. spine of ilium. 3d opened behind and above No. 2. Here ilium is denuded. No. 4 hard tumor at upper and inner part of thigh. Fluctuating at centre. Suppuration lasted 9 months. Death from exhaustion. See autopsy.
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52.—Bounaix, These de Paris, 1874. L. s. i. d. Incomplete.	25 M	Soldier. Severe with much injury to s. i. j. occurred some time after first symptoms.	Began with pain in s. i. j. on rising. Also pain in knee, which was easily relieved. 2½ years afterward pain on pressing together the ilia. Also sharp pain in knee. Also pain at superior and internal angle of thigh. Lies on right side.	Abscess noticed 18 months after beginning. Was aspirated. Small quantity of pus. This was at level of trochanter major and suppurated abundantly. One year small tumor over s. i. j. Abscess opened. 2½ years. Suppurated about 14 months.
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53.—Tiling. St. Petersburg. Med. Woch., July, 23, 1883. R. s. i. d. Recovery.	6 M	None.		
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Began to limp on right leg. Got so bad in a few mos. he could not walk. Marked passive movements very painful. Also active. Right gluteal region swollen and very tender as far as neighborhood of hip. Under narcosis, no shortening, no friction in hip. By rectum, a projection of r. s. i. j.

A circumscribed abscess found in the swelling just mentioned. Opened, discharged pus for some months and then healed. About a year. Some months. Diagnosis a little doubtful as to sacro-iliac joint.

<i>No. — Observe — Where pub- lished</i>	<i>Age and Sex</i>	<i>Occupation — Dia- thesis — Determ- ining cause assigned.</i>	<i>SYMPTOMS — Pain, Etc — Lamentness — Changes in Attitude — Tume- faction</i>	<i>ABSCISS — Appear- ance — Discharge — Suppuration — Health.</i>
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14.—G. Tilling, as before R. s. i. d. Recovered	27 F. Lady	Rheumatic pains in back fol- lowing exposure 7 years before.	Began with occasional pain in s. i. j., and lameness. After abscess broke, leg was flexed adducted, ro- tated inward and support- ed on left. Pain over symphysis; pressure un- bearable; pain down leg to foot. All movements of leg painful. Small, hard swelling noticed below ant. inf. spine of ilium.	Abscess below ant. inf. spine of ilium broke through with high fever and much pain. Fistula formed on ant. surface of thigh, below Pou- part also between tensor fasciæ lata and M. rectus cruris. Pressure in ingui- nal region evacu- ates pus. Under anæsthesia pus was found to pass via iliac muscle into pelvis. No carious bone found. Under rest and supporting treatment pa- tient's fistula closed and recovery ensued. Duration more than 2 yrs. Suppuration about 9 months.
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17.—G. Tilling, St. 15 M
Petersburg Med
Woch. July, 23,
1883. R. s. i. d.
Death. Autop-
sy Operation.

History meagre, 4 days be-
fore seen, patient seized
with sudden pain in right
gluteal region.

Abscess in gluteal
region gave great
pain. Tempera-
ture much eleva-
ted. Elbows also
swollen Abscess
opened superfi-
cially, but no pas-
sage found to deep
tissues. Operation
3 weeks after ad-
mission. Abscess
opened at left of
sacrum and found
to communicate
with right side
where a pass-
age led over the crista
ili into colossal
pus cavity involv-
ing psoas and ili-
acus. Tuberosity
of ilium softened
and largely re-
moved as was al-
so part of the sa-
crum. Remark.—
The elevated tem-
perature and pain
were probably due
to secondary in-
fection by pus mi-
crobes. Colliqua-
tive diarrhœa and
death.

No. —	Observer —	Age	Occupation —	Diagnosis —	Symptoms —	Pain, Etc. —	Abscess —	Appearance —
Where published.		Sex.	and thesis —	Determining cause assigned.	Lameness —	Changes in Attitude —	Tumefaction.	Discharge — Suppuration — Health.
18.—	G. Tilling, as before. L. s. i. d. Operation. Death. Autopsy.	14 M	Previously healthy.		History not minutely detailed; small swelling on left buttock.			Four months later this swelling was increased to an enormous gluteal abscess. Operation. Free incision. Enormous quantity of pus came from below the gluteal muscles and out of sacro-sciatic foramen. The tuberosity of ilium was entirely chiselled away, almost, as also the post. half of upper border of the great sacro-sciatic notch. The edge of the os sacrum was removed to facilitate drainage. Abscess in hollow of sacrum which was partly denuded. Remark. Patient died eight weeks after the operation with colliquative diarrhoea; suppuration had been very severe.
35.—	F. J. Gant, Lancet, Sept. 1887. L. s. i. d. Operation. Recovery.	36 M	Married. Admitted March, 1887. Had a fall from a ladder 18 months before.		Abscess painful on deep pressure; standing, sensation as if pelvis were giving away. No lameness; some abduction and eversion of limb with slight forward projection of foot.			An abscess was present on admission, over the sacrum, to the left of the median line. Evidement was practiced with recovery.
36.—	F. J. Gant, Lancet, Sept. 1887. L. s. i. d. Operation. Recovery.	19 F	Admitted June 29, 1887. Stood much on feet. No trauma.		Felt as if falling asunder. Pressure on ilium caused pain in joint. Ant. sup. spine of ilium projected forward. Small lump noticed near left s. i. j.			An abscess the size of an orange over the joint. Treatment by evidement resulted successfully.
19.—	Dr. J. B. Mustin. L. s. i. d. Death. Autopsy.	25 M			Probe passed through openings in groin did not strike "dead bone." Great oedema of left leg. The right also became oedematous about 4 months before death. Patient died of exhaustion.			An abscess in left groin had been discharging for four months. A 2d opening made over great trochanter and a third on inside of thigh; suppuration very profuse; suppuration lasted about 12 months.

<i>No.</i> — <i>Source</i> — <i>to Acc. pub.</i> <i>linked</i>	<i>Age</i> <i>and</i> <i>Sex</i>	<i>Occupation</i> — <i>Dis-</i> <i>ease</i> — <i>Deter-</i> <i>min-</i> <i>ing cause</i> <i>assigned</i>	<i>Symptoms</i> — <i>Pain, Etc.</i> — <i>Lameness</i> — <i>Changes in</i> <i>Attitude</i> — <i>Union</i> — <i>fraction.</i>	<i>Abscess</i> — <i>Appear-</i> <i>ance</i> — <i>Discharge</i> — <i>Rupturation</i> — <i>Heath.</i>
— Dr. Mayne, N. Y. Med. Rec. Dec. 20, 1893. K. and A. copy	61 M	No history of trauma. Had had elephantiasis of penis.	Began suddenly with violent pain in the right hip, extending along outer and post. portion of thigh to the knee. Recurred after a few weeks. Patient walked about, even after abscess was aspirated.	Soft tumor discovered on anterior surface of thigh, just below Poupart. This was aspirated. Patient died of exhaustion consequent upon intractable diarrhoea.
21 — Dr. A. Sayre, Orth. Surg., 1891. 1 year. Doubtful. Death. Autopsy	4 M	Thinks there is a history of traumatism, boy having hurt himself by jumping.	Pain has existed for some months and lameness some weeks with tenderness over both thighs.	A very large abscess in left groin. Duration of disease probably about 6 months.
22 — Dr. C. A. Sayre Hitherto unpublished	3 M	Fell behind a trunk.		Abscess in lumbar region noted some months after injury. Valvular incision by Drs. Parker and Mott, was twice practiced. Ectetic set in and Prof. Sayre made a free incision. Carious bone was removed from both sacrum and ilium. The wound, being packed with oakum and Peruvian balsam, patient recovered in three months.
Dr. C. Sayre, Hitherto unpublished, 1897. K. and A.	25 M	Fell from a horse.	Had been treated for morbus coxarius for 2 years. Had curvature of spine to compensate for half an inch lengthening of the right limb due, as Dr. Sayre adds, to actual drooping of the ilium.	An extensive abscess over the posterior portion of the iliac crest was freely opened by Prof. Sayre and carious bone removed from surface of both sacrum and ilium. Dressed with Peruvian balsam and oakum. Extension applied in bed and afterward high-heeled shoe on sound side with crutches during day. In 14 months recovery was perfect.
23 — W. Van Hook	32	Unknown.	Patient noticed a sudden	Two intra-pelvic abscesses occurred; one pointing in the lumbar region, the other in the groin. Operation. Recovery.

EDITORIAL ARTICLES.

ON THE FUNCTIONAL PROGNOSIS OF TENDON SUTURE.¹

In a comprehensive paper, Dr. Wolter, Assistant at the Clementia Hospital in Hannover, considers in detail the prognosis of suture of divided tendons with special reference to the restoration of function.

Extensor tendons of hand.—Wounds of the extensor tendons of the hand he considers to give better results than in the case of the flexors, because of their anatomical relations, and the results are better with certain tendons than with others, in consequence of the different relations which they bear to the surrounding tissues over the wrist joint, the metacarpal bones, the phalanges, and the interphalangeal joints, influencing the amount of retraction and the liability of adhesions to the integument or other contiguous structures.

Extensors of thumb, when divided at back of hand—Both extensors of thumb glide over the first metacarpal bone, within a wide connective tissue sheath which is rich in elastic fibres and through which the tendon is more or less bound down to the periosteum. The displacement of these tendons by motion is about 1 cm. and when cut over the metacarpal bone they will retract about this distance.

When cut above the metacarpal bone, the central end will retract as much as 10 cm. The resulting functional disturbance, without any attempt at suturing is as follows: Thumb flexed, first phalanx less than second, active extension of both phalanges impossible, passive extension allowed.

The search for the central end of cut extensors of thumb, when divided over the metacarpal bone, is carried out according to Sédillot, by making a long incision, not over tendon, but parallel and to one

¹Archiv. f. klin. Chirurg., Bd. 37, Heft 1.

side of it, dissecting up a flap of skin, and searching for the sheath in the subcutaneous cellular tissue and opening the same on the side.

Extensor Communis Digitorum and Extensor Indicis at back of hand.—The extensor tendons of 2d to 5th finger at back of hand are worthy of special mention, for they present the most favorable anatomical relations for healing, viz., the great motility of the skin on back of hand, and the relation of the tendons to the superficial fascia.

The tendons lie more or less bound down in a fold of the superficial fascia, which is connected to the skin by loose connective tissue, and firmly bound down to the deep fascia, in such a way, that in moving they draw this fascia over the metacarpal bones; thus but little retraction is possible after division of these tendons. Here the result of primary sutures is generally very good.

Extensor tendons divided over wrist-joint.—The anatomical relations are not very favorable, for here many tendons lie together and make wide excursions 4 cm. during flexion and extension of hand and fingers. Here regeneration is difficult for the tendons lie within synovial sheaths and but little blood can be extravasated, hardly enough to set up the necessary irritation.

Extensor tendons divided at metacarpo-phalangeal articulation.—Here the relations are extremely favorable for rapid healing, for the tendons are bound down to the capsule of the joint, and there is little if any retraction possible even though the joint be opened.

Extensor tendons on dorsum of fingers and over interphalangeal articulations.—Here prognosis is not favorable, especially when the joint is opened; it is better where the tendon is severed over the first phalanx, and becomes less favorable as the last phalanx is neared, a glance at the anatomy of the finger will readily explain the reason.

Flexor tendons divided over wrist-joint.—It is to be noted, that in general, the slightest shortening of these tendons interferes with extension of the hand or fingers, and it is known that by the strongest dorsal flexion, the flexor tendons, which follow the excursions of the bones are stretched ad maximum, and lie close to the bone, so that their length just suffices. Dorsal flexion will be hindered by the slightest adhesion between the cicatrix of the tendon and the skin, and still

worse is it when several flexor tendons are matted together in a dense scar as is seen in attempting secondary suture.

In this region there are two fasciæ, the strong deep fascia which bridges over the flex. sub. dig., the flex. prof. dig. and the flex. long. poll. muscles, the vessels, (excepting the radial artery), and the nerves without being connected with these muscles; and the thin superficial fascia which is strongly attached to the surface of the flex. carp. ulnaris and passing over the anterior surface of the forearm is partially merged in the deep fascia, and partially assists in forming sheaths for the tendons of the palmaris longus, and flexor carpi radialis.

Both of these tendons in going from dorsal to volar flexion make an excursion of $1\frac{3}{4}$ cm. The palmaris tendon retracts this distance when it is divided above the wrist-joint, while the tendon of flex. carp. rad. retracts more still. The tendon of the palm. long. does not lie free in its sheath, but is surrounded by cellular tissue which connects it by tendinous fibres to the fascia.

The flexor carpi ulnaris is muscular up to its insertion in the pisiform bone, and its muscular fasciculi arise in part directly, in part indirectly, by means of a strong tendon from the ulna. It lies between the superficial fascia to which it is firmly united, and the deep fascia, hence not much retraction is possible.

From this hasty anatomical glance, it is to be seen that after division of the tendons of the flex. radialis, flex. ulnaris, and palm. longus, the cicatricial process is isolated and takes place above the deep fascia and the prognosis will be better than when division of the deep fascia, even though only the two superficial tendons of the sublimis are totally or only partially severed.

Tendons divided in the palm of the hand.—The results here are more favorable than at the wrist-joint. The retraction of sublimis in metacarpal region is 3 cm.; that of profundus 2 cm.; further retraction is prevented by the so-called cellular sheath, which connects these tendons with those in the neighborhood. Here to find the central end, the incision is to be made not over the tendon but parallel and to one side, opening the sheath on its side.

Flexor tendons divided over the phalanges.—The retraction of cen-

tral end of tendon after section of flexor tendons over phalanges is, in general slight, on account of the binding down of the tendons by the vinculae. Most retraction takes place in section over the first phalanx and at base of second, as much as 2 cm., retraction can take place. At second phalanx the sublimis tendons merge so with the periosteum that suture is out of question. The profundus tendon is in such relation with 2d phalanx that when cut not more than 1 cm. retraction occurs. Prognosis for tendon suture in region of first phalanx is better than for any other phalanx.

Tendons divided on dorsum of foot.—Prognosis here is good. Two cases reported by author. Tendons lie in strong connective tissue sheaths under the skin, but in going over from dorsal to plantar flexion they make excursions of 4 cm. and retract that much when cut. The method advised by Sedillot is to be used when suturing is attempted.

Subcutaneous rupture of tendon of quadriceps femoris and of ligamentum patellæ.—The question of suture in rupture of tendon of quadriceps dates back to 1847, when Renouard first proposed it, but it is extremely difficult and but very few cases have been reported. The rupture of the tendon itself does not take place, but it is a tearing off of its thin insertion in the border of the patella.

Three cases of rupture of the ligamentum patellæ treated without suture have been reported, healing taking place, but with lengthening of tendon.

Tendo Achillis.—If division takes place in adults, at 3 cm. from its insertion, there will be but little separation of the divided ends, and the tendon may yet partially act. If division occurs above this point then there is a gap amounting to over 4 cm.

The results in primary and secondary suture of this tendon have been good.

F. C. HUSSON.

INDEX OF SURGICAL PROGRESS.

ABDOMEN.

I. The Surgical Treatment of Perforating Ulceration of the Stomach and Intestine. By DR. STEINTHAL (Heidelberg, Stuttgart.) Three cases of peritonitis due to perforation occurring during the past 2 years in the clinic of Czerny in Heidelberg have caused an inquiry into the results of other operators in similar cases. In addition to the above there are 18 recorded cases of operation for perforating ulceration of the intestine or stomach. Eight cases recovered. In five of these there was circumscribed encapsulated peritonitis. In one case intestinal suture was resorted to. In still another the vermiform appendix which was free in a hernial sac was resected. In the remaining three cases incision with drainage was resorted to as in an abscess, to a certain extent anticipating the mode of spontaneous recovery. In three additional cases (cured) we find two of Mikulicz and Krönlein in which diffuse purulent peritonitis already existed. The third case has recently been reported by Lücke; here there was acute suppurative peritonitis following a small perforation. In the 10 unsuccessful cases the operation was resorted to too late, or the perforation was not found or collapse set in, in which case, as in Krönlein's, an autopsy not having been permitted, the cause remained obscure.

It is very important, however, to note the fact that in no case was the operation harmful or the cause *per se* of a beginning general peritonitis in cases where this process had previously been circumscribed. We are justified, inasmuch as the operation is still a new one and we are in the beginning of its study, to hope that future experience will secure better results. It is very important in a prognostic sense to diagnose perforative peritonitis, as early as possible and to fix in advance the point of perforation. The diagnosis of peritonitis due to

perforation is aided by the history (previous stomach symptoms, typhus ambulatorius, typhlitis) the sudden onset of the peritonitis, a collection of free gas in the peritoneal cavity (tympanites, diffuse sonorous percussion, with metallic timbre, absence of hepatic dulness.) The following aid as to the seat of perforation. Absence of odor in the gas on opening the peritoneum with comparatively slight septic properties points to stomach perforation. The ileum and colon allow an odoriferous gas of rapid septic acting qualities to escape. With the jejunum we have a slight escape of contents and gradual onset of symptoms (Czerny.) On the other hand a rapid disappearance of liver dulness and marked meteorism speak for perforation of the stomach. Added to this we also have circumscribed dulness and local tenderness.

Three cases occurring in the Heidelberg Clinic illustrated the above.

1. Servant, æt. 20, female, has recently suffered pains in the stomach; five days previous to admission severe pain in the left epigastrium; next day abdomen swollen, dyspnœa; since then general condition very bad; no vomiting, no movement from bowels; on admission abdomen much distended, very sensitive; diffuse tympanitic resonance with the hammer and pleximeter, a metallic ring on the left side, liver dulness absent, slight dulness in both lumbar regions. Diagnosis, tympanites on account of perforation. Laparotomy in linea alba; on opening the peritoneum an odorless gas escaped, slight peritonitis on the anterior aspect of the smaller curvature of the stomach, intense injection of the serosa and recent pseudo-membrane (fibrinous), perforation not found, death after four days. Postmortem: ulcerating perforation on the anterior stomach wall, circumscribed subphrenic peritonitis which subsequently became general.

2. Waiter, æt. 33. Some time past suffered once with stomach trouble. Three days before admission after a rapid movement, sudden pain occurred a hand's breadth to right of umbilicus and a subjective feeling of something having fallen into the abdomen. Since then he has experienced constant vomiting, no movement from bowels, no passage of gas. Abdomen in epigastrium and hypochondrium strongly inflated, diffuse tenderness especially on the right; diffuse tympanitic resonance;

in both lumbar regions dulness which on the right extends a hand-breadth over Poupart's ligament as far as the midline and which does not disappear by change of position; absence of liver dulness. Diagnosis. Collection of gas in peritoneum caused by perforation of stomach or cæcum. On opening the peritoneum in the linea alba gas escaped with strong odor. A pericæcal collection of pus corresponds to dulness over the right Poupart's ligament but no perforation. The latter found on the pyloric end of the stomach. Continuous suture. Death at night. Autopsy. Diffuse fibrinous peritonitis, perforation of an old ulcer of the stomach with circumscribed peritonitis at this spot.

3. Male, æt. 52, awakened one morning with severe pain in the ileo-cæcal region. Rest, icebag, diet. On the next day sudden severe pain in the ileo-cæcal region and collapse. The abdomen previously soft began to distend gradually; dulness of the left lobe of liver gradually disappeared. Ileo-cæcal region shows dulness and resistance—a circumscribed dulness size of a silver dollar. Diagnosis. Acute typhlitis, circumscribed perforative peritonitis which has suddenly become general. Laparotomy over the ileo-cæcal region; no marked escape of gas; resection of the perforated necrotic vermiform appendix. Continued improvement in the first 3 days. Fifth day distended abdomen, restlessness, nausea, vomiting, gradual collapse; death on morning of the sixth day. Autopsy. Peritoneum in comparatively good condition; the peritoneal surface of the vermiform process covered with fibrin and pus. Small intestine markedly distended and contains much fluid.

In the first case the seat of perforation could be fixed by the history (previous stomach symptoms) the escape of odorless gas on opening the peritoneum, the comparatively slight peritonitis and the injection and pseudo-membrane on the anterior surface of the stomach. In the second case the diagnosis lay between stomach and cæcal perforation. The history of previous stomach trouble and the localized pain to the right of the umbilicus spoke for the first with the rapid tympanites and the absence of liver dulness. For the latter diagnosis we have the fixed dulness over the right Poupart's ligament, and the apparently advanced peritonitis. The diagnosis in the third case was simple. The

fatal termination of the first case was caused by a failure to find the perforation. In the second case the patient was much collapsed before operation. In the third case the injection of the peritoneum was too intense or the disinfection insufficient; against which we have the continued improvement for three days; or perhaps the after-treatment was faulty, inasmuch as the patient was very restless, drank very much, and had no passage either of feces or gas in spite of an inserted rectal tube. Minim doses of opium, restricted diet and occasional use of the stomach pump were perhaps here indicated.

As to the technique of the operation it is to be remarked: In slight circumscribed peritonitis due to perforation, incision, emptying of contents after manner of Schroeder and Escher with closure of perforation by suture should be resorted to. We should avoid too much manipulation. Failing to find the perforation and in general peritonitis the abdomen should be laid open by a liberal incision. In a perforation previously diagnosed we may make an incision somewhat to the side for the cæcum. For the stomach and duodenum an incision in the linea alba from the umbilicus upwards. The peritoneum is next opened by a very small incision in order to decide the character of the escaping gas. The operation is further carried out in the manner familiar in intestinal surgery and laparotomy. Finally the peritoneum is irrigated with 1% salicylic acid until the fluid returns clear and the loops of intestine most strongly infected are sponged off with 0.5% sublimate. The Gersung's iodoform wick is recommended for drainage.

Discussion.—DR. LAUENSTEIN thinks an actual cleansing of the peritoneum in perforating peritonitis is impossible and dangerous, inasmuch as the bacterial fibrin layer must not be rubbed off the intestine mechanically. On operating again he would fill the abdomen with an antiseptic fluid (salicylic solution) then reverse the patient and allow it to flow out and repeat this several times.

DR. FRANK (Berlin) mentioned two cases of Hahn operated for perforating typhoid ulcers, both being fatal; yet he approves of the operation inasmuch as the patient being under the observation of the physician the early diagnosis can be made and the place of perforation fixed.

DR. POLCHON (Danzig) thinks that recovery is only possible when the patient is operated 2 or 3 hours after perforation. In cases of his own he has found the serosa so invaded with bacteria that a thorough disinfection would scarcely be possible. We should try to localize the process with opium. If on laparotomy we find the pus only on the intestinal surface the prognosis is favorable. But if the pus is diffused between the coils of intestine a further surgical interference is useless.

DR. TILMANN (Leipzig) had successfully operated upon an old encapsulated abscess which originated through a perforation of the stomach.

DR. SONNENBERG (Berlin) recommends in cases of suspected abscess after perforation of the vermiform appendix, incision of the abdomen as far as the peritoneum. An abscess present can easily be found.

DR. WAGNER (Konigshütte) operated upon a man with perforation of a duodenal ulcer after lifting a heavy weight. The diagnosis was rupture of the bladder. The point of perforation was found on autopsy only. The opening of an abscess between the intestines is most difficult. In one case he had opened 12 abscesses and post-mortem had found one still existing.—*Beilage zum Centralbl. f. Chir.*, No. 24, 1888.

HENRY KOPLIK (New York).

II. Penetrating Stab-Wound of Abdomen with Prolapsus of Omentum and Bowel. By Dr. ALEXIS S. VVEDENSKY (Moscow, Russia).—Dr. Vvedensky, house-surgeon to the Mariinskaia Infirmary in Moscow, reports two cases ending in recovery. I. A strong and healthy shoemaker's boy, æt. 11, fell down, a cobbler's knife penetrating from his right trousers' pocket into the abdomen. He drew it out at once, and noticed that "a bit of fat was protruding from his belly." For fear of punishment the boy said nothing to anybody until his mates happened to observe bloody stains on his shirt and sent him to the hospital. On examination, about 24 hours after the accident, a transverse wound, 1 cm. long, was found, situated 2 fingers' breadth below the right costal border; a conical piece of

dark red omentum, two and one-half inches long, covered with blood-clots and dirt, was seen protruding from the cut. Pain, nausea and fever were absent. Two hours later the parts were washed off, the strangulated piece of the omentum slightly dragged out, ligatured with catgut and cut above the ligature, the stump powdered with iodoform and returned into the abdomen, and the wound stitched with two silk sutures, passing through all the abdominal layers except the parietal peritoneum, after which a Listerian dressing and an ice-bag were applied. On the seventh day the sutures were removed, the wound being found soundly healed; on the tenth the boy was discharged in the best of health.

II. A peasant, æt. 38, of moderate build and nutrition, was stabbed, during a fight, by his mate, with a paring chisel, and fell on the ground, profusely bleeding. He was at once brought to the hospital, vomiting occurring several times on the way. On examination, about an hour after the accident, the left side of his abdomen was found covered with a mesenteric fan carrying a piece of the small bowel, 54 cm. long, and with a portion of the large bowel measuring 18 cm. in length. They were protruding from a small wound, "the upper angle of which was situated 10 cm. from the navel, while the lower one lay 11 cm. from the latter, and 5 from the iliac crest." The aperture admitting only a little finger, the author enlarged it slightly (1 cm.), washed out the prolapsed parts, which were intact, with an antiseptic solution, returned them into the abdomen, closed the wound with 3 deep and 4 superficial sutures, leaving the peritoneal layer untouched, and applied an antiseptic dressing and ice bag. On the tenth day the wound had healed *per primam*. On the fourteenth, the man left, well and sound. Dr. Vvedensky draws attention to the fact that the parietal peritoneum was intentionally excluded from suturing in both of the cases, his purpose being "to avoid any additional traumatic irritation of the already damaged peritoneum." As far as short (1 to 1½ cm. long) wounds of the abdomen are concerned, the danger of subsequent hernial protrusion is quite trifling; a firm adhesion of the peritoneal edges is to be safely expected. Dr. Vvedensky recalls that international literature contains a goodly group of such cases where the prolapsed omentum

was successfully either simply reduced or ligatured and excised. Of the Russian practitioners, Drs. Oks published 4 cases of the kind (*Vratch*, 1882, p. 327; and 1882, p. 391); Lindenbaum, 3 (*ibid*, 1883, Nos. 47 and 48); Kagan, 6 (*Meditsinsky Vestnik*, 1882, Nos. 35, 39 and 43); similar cases of Vasilieff, Teziakoff, etc., may be found in ANNALS OF SURGERY, Vol. viii, pp. 137-145.—*Vratch*, No. 24, 1888.

VALERIUS IDELSON (Berne.)

III. The Operative Treatment of Prolapse of the Rectum and Invagination of the Colon. By J. MIKULICZ (Königsberg). Mikulicz resected 76 cm. of the colon in a case of acute invagination of the colon with prolapse through the anus, occurring in his practice five years ago. The favorable result has induced him to resort to the same operation (circular resection) not only in cases of prolapse of the colon and acute irreducible prolapse of the rectum, but also in severe habitual prolapse of the rectum. He points out the fact that many such severe cases are not cured by the present methods, whereas by a circular resection permanent cure results. His experience includes six cases operated with success in the above manner. Billroth and Nicoladoni have in similar cases operated with success. The operation is thus described. In cases of habitual prolapse of the rectum, two strong sutures are drawn through the most dependent part of the prolapsed gut in order to fix the intestine. The field of operation is constantly irrigated with weak solution of carbolic or salicylic acid. The gut lying externally is then divided transversely, layer by layer, on its anterior face, one to two cm. in front of the anal opening. Every bleeding vessel is singly secured and ligated with catgut. On dividing the peritoneal covering of the external intestinal tube, the peritoneal pouch between the two portions of gut is thus laid open, and the peritoneal coverings of the internal intestinal tube laid bare. If loops of intestine prolapse they are replaced. The communication with the peritoneal cavity is closed by sewing the serous surfaces together with a series of fine sutures. Now the internal intestinal tube is divided anteriorly, just in front of the above row of sutures. The two extremities of the gut are then united, as far as divided, by deep

silk sutures which include all the coats of the intestine. The sutures are allowed to remain long and serve to steady the gut. Finally, both intestinal tubes are divided, layer by layer, in their posterior circumference. Here numerous vessels of the meso-colon are ligated, and the extremities of the gut united by deep sutures. The line of suture is dusted with iodoform, and after cutting short the sutures, the remainder of the gut is replaced. Neither drain nor bandage is applied, and the patient receives opium for six or eight days. The author described at length a case of chronic ileo-cæcal invagination with prolapse. The prolapsed gut, measuring 28 cm. in length, carried the ileo-cæcal valve on its vertex. On resecting the gut in the above manner, he failed to find the intussusceptum at the point of resection. The invaginated ileum had been destroyed to the extent of several cm. by gangrene. It was found fully 2 cm. above the anal ring, and opened here, surrounded by cicatricial tissue, into the colon. The resection was completed below the above point, and the case made a permanent recovery.—*Beilage zum Centralbl. f. Chir.*, No. 24, 1888.

HENRY KOPLIK (New York).

IV. Case of Perineal Hernia of Traumatic Origin. By DR. GUSTAV I. TRACHTENBERG (St. Petersburg). At a meeting of the Pirogovian Russian Chirurgical Society, Dr. Trachtenberg showed a case of this rare affection (according to Benno Schmidt, the number of fully trustworthy cases of perineal herniæ amounts yet only to 20). A healthy virgin, æt. 24, having lifted up a heavy stone, a few days afterward noticed a small swelling in her perineum, which began to gradually increase, and induced her to seek admission to a hospital about six months after the accident. On examination, her pelvis proved to have normal dimensions and configuration, but the genital slit was curved, its convexity being directed toward the left side. In the right side of the perineal region there was an ellipsoidal, slightly narrowed at the middle, tense, elastic, painless tumor which lay almost parallel to the raphé, occupying the posterior portion of the right majus labium anteriorly, and almost reaching the anus, posteriorly. It was covered with normal skin. On examination *per vaginam* the tumor

proved to encroach upon its lumen, its superior segment being vaguely felt about the right lateral fornix. The womb was displaced slightly toward the left side of the pelvis. On coughing and straining the swelling increased in its size, and became tenser. It could be reduced by external manipulations, but could not possibly be retained within the pelvis. According to Dr. Trachtenberg, the hernia having pushed aside the bundles of the levator ani, descended into the ischio-rectal space to pass with its apex in front of the transverse perineal muscle to the labium. In other words, his patient has an anterior perineal hernia. Cf. Ludwig Ebner's paper in the ANNALS OF SURGERY, vol. vii, p. 314, April 1888.—*Proceedings of the Pirogovian Russian Chirurgical Society*, St. Petersburg, vol. v, 1888.

VALERIUS IDELSON (Berne.)

GENITO-URINARY ORGANS.

I. Precocious Puberty. By MR. C. LUCAS (London). At the Clinical Society meeting, April 27, Mr. Lucas read a paper on Precocious Puberty (at the age of seven) accompanied by all the usual signs and due to a sarcomatous ovarian tumor, on the removal of which the condition disappeared. A case was mentioned by Dr. Money where the cause was a suprarenal sarcoma, and it was also stated ovarian tumors in young children did not always produce precocity.—*Lancet*, May 5, 1888.

A. F. STREET (Westgate).

II. Electrolysis in the Treatment of Resilient or Non-Dilatable Stricture of the Urethra. By F. SWINFORD EDWARDS (London). The author tabulates 24 cases in which this method has been adopted; the ages of the patients being between 21 and 70, with the following results: Cured, 2; improved, 12; failed 3; improved with electrolysis plus dilatation, 7. The number of "sittings" varied from 1 to 9; the time occupied by each one, from 5 to 30 minutes; the battery employed was a 30-celled Stoecher. The advantages claimed for this plan are absence of confinement, risk to life, pain and bleeding. If it should fail, it does not interfere with a subsequent urethrotomy in some form, and it is thought that if a cure is effected it may

be permanent. The only disadvantage stated, is the time occupied in its application. The worst cases of urethral strictures are undoubtedly met with in hospital practice, but very often in the best regulated establishments, any apparatus necessitating the use of a battery frequently proves vexatious and disappointing. Whether this plan of treatment will ever become general, or supercede more readily applied methods, in the hands of busy practitioners, is a matter of doubt. Moreover, the permanency of the cure in successful cases must be decided by time.—*Med. Press and Circular*.

T. F. CHAVASSE (Birmingham).

III. Mixed Gonorrhœal Infection. By M. BUMM (Wurzburg) M. Bumm in a communication to the Medical Society of Munich, discusses a theory under the name of mixed infection, which he describes as the penetration into the organism of several species of bacteria. For example, a tuberculous patient can be attacked with erysipelas; a lying-in woman suffering from gonorrhœa, may become the subject of a septic infection. Such cases as these, however, which result from mere chance infection, do not present any particular features of interest. But there is another variety of mixed infection in which there exists some relation between the different germs, in the sense that the one precedes the other and prepares the soil for fructification of the latter. These forms of mixed infection are characterized by being constantly associated with certain definite microbes. Taking pneumonia as an instance, under the the influence of the bacteria of pneumonia the pulmonary alveoli lose their epithelium and throw off an exudation which serves as a medium for the development of the tubercle bacillus or pyogenic germs, and again pneumonia may be followed by phthisis or purulent infiltration of the liver; the specific microbe of gonorrhœa, the gonococcus of Neisser, can also modify the mucous membrane of the genito-urinary tract chiefly in women, in such manner as to render easy the invasion of certain of the microbes. The proof of this is to be found in the cases of gonorrhœal infection of the vulvo-vaginal glands. When the infection of the glands remains purely gonorrhœal the acute purulent stage is succeeded by a chronic stage

which may last for some months ; the swelling gradually subsides and subsequently atrophy and partial sclerosis of the gland follow. These features, however, assume quite another aspect when the gonorrhœal attack is complicated by an invasion of pyogenic microbes. The gland, for example, soon becomes enlarged and tender, and suppuration follows. In the abscess and cellular tissue surrounding it there are no gonococci to be found; the pus only contains the pyogenic staphylococcus which has exterminated the gonococcus of Neisser. Another kind of mixed gonorrhœal infection is met with in the consecutive invasion into the vulvo vaginal gland of non-pathogenic germs which increase and multiply upon the mucous membrane of the vulva. They make their way into the gland and cause decomposition of its contents. In the place of Bartholin's gland, cysts are found, full of serous fluid in which rod-shaped microbes can be detected. This cystic disease is distinguished from acute suppuration by the absence of pain and symptoms of suppuration. The cystitis which accompanies gonorrhœa, is again, a variety of mixed infection. Bumm does not admit the existence of a gonorrhœal cystitis properly so-called, which is caused by the penetration of the gonococci into the vesical mucous membrane. The stratified epithelium of the bladder is impenetrable to the gonococcus. The cystitis is due according to the author to another species of microbe resembling the gonococcus of Neisser, but distinguishable from it, by taking a different staining. It would seem that the gonococcus cannot penetrate into the deeper tissues, and excite inflammation. The superficial layers of the mucous membrane are its exclusive domain. But how can para- and parametritis due to gonorrhœa be explained except upon the hypothesis of a mixed infection? In two cases of purulent parametritis the author found only pyogenic microbes and not gonococci, in the purulent discharge. Suppurative parametritis following gonorrhœa is analogous to a gonorrhœal bubo which has been caused by pyogenic microbes. The question as to the cause of cases of non-purulent parametritis is a difficult one to decide, for in these, examination of the exudation, reveals the absence of all micro-organisms. Perhaps the inflammatory symptoms are due to absorption of irritative substances, purely chemical,

elaborated by the mucous membrane which is the seat of gonorrhœa. The author states, further that whilst puerperal pelvic cellulitis with suppuration, when communicating with the cavity of the peritoneum causes general peritonitis, because the pus contains pyogenic staphylococci, the pus of a gonorrhœa which escapes into the same cavity from the Fallopian tubes only produces a local inflammation. Lastly, some clinical observations seem to show that in the etiology of localized tuberculosis of the genital organs, gonorrhœal infection plays a certain role, and gonorrhœal rheumatism which has been attributed to the gonococcus, should in the author's opinion be regarded as the result of mixed infection, inasmuch as pyogenic microbes have been detected in the affected joints.—*Le Bulletin Medical*, Dec. 25, 1887.

H. PERCY DUNN (London).

GENERAL SURGERY.

I. Peat-Moss as a Dressing. By Dr. N. N. JAKIMOVITCH (St. Petersburg, Russia).—The author has subjected to a macroscopical, microscopical and bacteriological examination a specimen of commercial Russian peat-moss. The specimen represented a fairly firm, but extremely light and voluminous mass of a light brown color. It proved to consist mainly of tiny stems of several Russian species of the *sphagnum*. Besides there were found many foreign detritus-like admixtures, such as minute fragments of shrubs, disintegrated roots, broken leaflets of various plants, etc. Under the microscope there were seen, besides the *sphagnum*'s leaflets and branches, various vegetable fibres of an undeterminable origin, numberless big spores of mould-fungi, and microbes of varying kind and size. A series of bacteriological experiments, with due sterilizing precautions, showed that this would-be "aseptic" dressing material contained masses of mould fungi of several sorts, including the *penicillium glaucum*, and at least three different species of large and small micrococci, one of which formed point-like slightly opalescent, the other somewhat larger, greyish white, colonies on meat peptone jelly. Their pure cultures, grown on agar-agar and jelly gave nail-like colonies with a white smooth head; all of them liquefied gelatine. To determine the hygroscopic or

absorptive properties of the material, Dr. Jakimovitch immersed portions of it into water and milk, and measured the amount of fluid absorbed under various conditions. His general conclusions are these : 1. The peat-moss examined does not represent anything like an aseptic or antiseptic dressing. 2. Being friable, and when dry, apt to break into powder, it can very easily fall out of pads and bags, soil the patient's linen, contaminate the wound, loosen the dressing, etc. 3. Being voluminous, it is inconvenient for transportation in war times, unless it is transformed into compressed tablets. 4. It possesses, however, a high absorptive power. 5. At all events, to be fit for surgical use; the moss requires a most careful treatment in order to make it fully aseptic and antiseptic.—*Voënnno Meditzinsky Jürnal*, June, 1888.

II. Antipyrin as an Antiseptic in Surgical Practice. By Dr. A. F. LENEVITCH (Tobolsk, West Siberia).—In the *Internationale Klinische Rundschau*, No. 1, 1888, Dr. Neudoerfer has emphatically declared (on the ground of physiological and clinical experiments of his own) that antipyrin is a most powerful antiseptic, since it arrests putrefaction and destroys microbes. Hence he recommends a 5 per cent aqueous solution of the drug as an effective substitute for a 5 per cent solution of carbolic acid, the advantages claimed being (*a*) antipyrin does not irritate wounds; (*b*) acts as an anodyne, and (*c*) does not injure either the surgeon's hands or his instruments. Further, Neudoerfer eulogizes the drug as a dry dressing for chancres, gonorrhœa, scrofulous ophthalmia, etc. His statements have induced Dr. Lenevitch to undertake a long series of bacterioscopic experiments for studying the action of antipyrin on young (2 or 3 days') pure cultures of the staphylococcus pyogenes aureus and streptococcus pyogenes. Dr. Lenevitch's main results, briefly told, are these : 1. When preserved in the shape of a dry powder without any special sterilizing precautions, antipyrin (Lucius Bruening's) can contain living microbes of various species, including the staphylococcus aureus. 2. In a 1 or 2 per cent solution the drug somewhat retards, but by no means arrests, the growth of various microbes living in water and air. 3. A 3 per

cent solution slightly (3 or 4 days) retards the growth of schizomycetes and, as far as the streptococci (or other bacteria possessing a relatively weaker vitality) are concerned, makes the nutritive medium unsuitable for their life (that is, arrests their growth). As regards the staphylococcus aureus and other more stable micro-organisms, their growth ceases only in a 7 per cent and stronger solution of the substance. 4. But even a 50 per cent solution of antipyrin proves entirely powerless to destroy either the staphylococcus or streptococcus, and that even when the latter remain in contact with the former for full ten minutes. [The antipyrinized bacteria when subsequently inoculated in a meat peptone jelly, give as beautiful cultures as those are which are derived from the non-antipyrinized ones.] 5. On the whole, the anti-bacterial effects of antipyrin are at least ten times less powerful than those of carbolic acid [which, according to Nothnagel and Rossbach, destroys microorganisms only when the strength of its solution reaches 40 per cent]. In other words, antipyrin belongs to very weak antiseptic substances.—*Pract.*, 1888; Nos. 16 and 17.

III. Anti-bacterial Action of Antipyrin. By Dr. NIKOLAI F. KELDYSH (St. Petersburg, Russia).—Dr. Keldysh has carried out numerous bacteriological experiments for verifying Neudoerfer's startling statement concerning the antiseptic power of antipyrin. He inoculated dry pure cultures of the staphylococcus aureus and albus and micrococcus prodigiosus in a solid nutritious jelly containing 2.5, 5 and 10 per cent antipyrin. In every one of the experiments an excellent growth of the microbes was invariably obtained which did not in any way whatever differ from that in a set of controlling test-tubes containing a non-antipyrinized nutrient jelly. There was not even any retardation in the bacterial growth; hence Dr. Keldysh goes still further than Dr. Lenevitch and says that antipyrin does not possess any antiseptic properties at all.—*Russkaia Meditzina*, No. 26, 1888.

IV. Tetanus Hydrophobicus. By Dr. SAMSON A. MAISURIANTI (Tiflis, Russia).—At a meeting of the Caucasian Medical Society, Dr. Maisuriantz showed an extremely rare case of Rose's *Kopftetanus*, or tetanus hydrophobicus, in a male patient. About six

weeks before an ulcer had appeared in his right temporal region. Under the influence of some simple domestic means it began to heal in three weeks or so. During the cicatrization the man commenced to experience pain about his face, while, a couple of days later, there supervened severe trismus, dysphagia and paralysis of the right facial nerve. All other muscles of his body remained intact. Some improvement followed the use of bromide of potassium in large doses; hence the author hopes that the case will terminate favorably. International literature is said to contain only 17 similar cases, with 5 recoveries. In all but two the symptomatology was identical with that of Maisürantz's case, while in Thaden's the upper limbs were simultaneously affected, and in Hadlich's general spasms supervened.—*Proceedings of the Caucasian Medical Society*, No. 8, 1887-88.

VALERIUS IDELSON (Berne).

V. The Technique and Value of Transplantation of Mucous membrane. By A. WOELFLER (Graz). In the human subject the functional integrity of a part is endangered by the presence of extensive cicatrices, or their production by excision. The excision of a cicatrix without union of the wounded edges of the part causes a repetition of the disturbances with the appearance of a new cicatrix. This is especially true of the mucous membranes of the mouth, œsophagus, rectum, urethra and eyelids. Woelfler has endeavored to remedy the defects in mucous membranes caused by excision as removal of cicatrices with mucous membrane. This end was obtained by the transplantation of mucous membrane from the human subject. The mucous membrane was removed from either a prolapsus uterus or rectum in strips of 3-4 cm. \times 1-3 cm. The method was similar to that followed by Thiersch with the epidermis. Adhesion occurred with the same certainty as in the case of the skin. This was especially true if the mucous membrane was taken from young subjects and placed on wounds three or four days old. Later on the mucous membrane was transplanted from animals to the human subject. The mucous membrane of the stomach of a frog, the œsophagus of the pigeon, and rabbit, the mucous membrane of the bladder of the rabbit were found

available. All these allowed of easy separation from their muscularis and united with the wound in their whole extent. It is not yet established how resistant the animal mucous membrane is as compared to that of the human subject. Its union when transplanted is well established. The author has performed transplantation of mucous membrane in seven cases, as follows :

1. In three cases of impermeable stricture of the urethra external urethrotomy was performed, the callus excised after the manner of a tumor, and with it the diseased urethra. The surface of the wound was covered after the fourth or fifth day with transplanted mucous membrane. A retained catheter was introduced either through the external meatus or the central opening in the urethra. This catheter served as a model for the new urethra. The diameter of the urethra was retained in all three cases. In one case the anatomical continuity of the urethra could be demonstrated after a lapse of six months from the time of transplantation.

2. In two cases of blepharoplasty restitution of the removed conjunctiva could be positively established.

3. One case of rhinoplasty and one case of meloplasty. In canals bougies and catheters must be resorted to for a variable period subsequent to operation, on account of the contraction of tissues surrounding the new mucous membrane. Transplanted mucous membrane remains most permanent in those places where it borders on mucous membrane.

Discussion.—Prof. THIERSCH (Leipzig) remarked the results of Wölfler were an important advance concerning transplantation reported in a former congress, of the skin of the negro to a white person, or vice versa, he had stated that the transplanted skin retained its color. This subsequently was proven erroneous. The transplanted negro skin in time became white, and vice versa. Histological study by Karg revealed that the belief that the pigment forms in the rete cells and is reproduced is incorrect. Pigment is brought to the rete by wandering cells loaded with pigment from the deeper strata. Therefore, it follows that white skin transplanted to the negro must become pigmented, while the contrary becomes true when the pigmented skin is cut off from its supply

of pigment. A case of the speaker in which a defect of the mucous membrane in the mouth was replaced by the skin of the cheek and on which hair continued to grow toward the buccal cavity seems to question the validity of the doctrines of Virchow, that cells conform to their surrounding.—*Beilage zur Centralblatt f. Chir.*, 1888, No. 24.

VI. The Histological Phenomena Involved in the Union of Peritoneal Folds. By DR. ERNST FRASER (Erlangen.) In this experimental work the author used guinea pigs, rabbits, dogs and cats. By an original method folds of intestine were brought into contact with each other in such a manner as to cause a union over a broad surface of peritoneum of the intestine or intestine and abdomen. Peritoneal surfaces thus opposed may unite (1) By direct union of one endothelial surface with the other. Here we find under the microscope with the highest powers simply one endothelial surface opposed to the other—absolutely nothing else. These surfaces cannot be pulled apart without disturbing anatomical relations with the subserosa. This shows some actual union. No wandering cells or exudate is found. The author theorizes that this union is caused by an interweaving of the endothelial elements of both surfaces by means of spindle shaped processes; this mode of direct union may be seen after space of 36 hours. In the second form of union (2) The layers of apposed endothelium are first thrown off and there is a union between the subendothelial layers of the peritoneum. The endothelium is first noticed to become swollen, to proliferate and partly disintegrate so that there may be formed two or three layers of endothelial cells. The proliferated cells have a more cubical shape than the original endothelium. Karyokinesis is seen. But there is no marked presence of wandering cells. The subendothelial layers unite by means of their spindle-shaped elements having numerous processes. These connective tissue elements (Fibroblasts of Ziegler and Neumann) have already been described. Their processes become continuous with the fibrillæ of the new formed connective tissue. These spindle-shaped cells with many processes proliferate to a marked degree. In some spots this proliferation is more marked than others, where there is no direct union of the

subendothelial layers by means of their connective tissue elements. This has been prevented in the author's specimens by the presence of minute spaces which subsequently became filled up with a new tissue (connective) with new formed vessels; thus in this second form of union we have two series of phenomena. This mode of union of subendothelial layers may be best seen in experiments where the endothelium has been destroyed by silver or other agent.

The above mode of union is seen after 2 to 4 days. The remaining forms of union of peritoneal surfaces with each other are (3) Union with formation of exudate and proliferation into the same of spindle shaped cells. (4) Formation of exudate and growth in the same of vascularized connective tissue. (5) Suppuration with subsequent formation of granulations. The author does not doubt that in the first and second forms of union the endothelial cells are converted subsequently into connective tissue elements.—*Zeitschr. f. Chir.*, bd. 27 heft 5 and 6.

HENRY KOPLIK (New York).

NERVOUS AND VASCULAR SYSTEMS.

I. Simultaneous Paralysis of the Ulnar and Radial Nerves from the use of Esmarch's Elastic Bandage. By HUGO KOEBNER, (Germany). A case of the above character is reported. The bandage was applied for an operation on the left elbow-joint. The use of the Faradic and constant current finally brought about restoration of function. It is recommended that the Esmarch bandage be only used in cases of prolonged operation, and that care be taken to avoid pressure beyond that which is needful for the purpose of emptying the vessels, and restraining the flow of blood to the parts within the field of operation.—*Deutsche Med. Woch.*, No. 18, 1888.

G. R. FOWLER (Brooklyn).

II. Clinical and Experimental Contributions to Ligature of the Femoral Veins Below Poupart's Ligament. By DR. ALEX. VON KORETZKY, (St. Petersburg). The author during an ope-

ration for the extirpation of carcinomatous glands in the thigh in a female, æt. 48, wounded the femoral vein above the entrance of the saphena and external circumflex. Ligature of the wounded vein was resorted to below the point wounded. The patient made a good recovery, though the integrity of the thigh was threatened for a short time as shown by cyanosis, and reduced temperature which set in after ligature, but soon passed off.

Of 28 cases of ligature of the femoral vein exclusive of the above case, there were 14 recoveries. In these 14 cases the vein was ligated between the lig. Poupartii and the fossa ovalis eight times. In four cases the superficial external femoral was tied, and in two cases the point ligated is not given. In five cases of the eight first mentioned, the operation was for the extirpation of a tumor. The operation was performed for wound of the vein in only three cases. In the lethal cases ten were affected with gangrene.

From experiments conducted by himself, the author concludes that ligature of the femoral vein in any point of its course between Poupart's ligament and the fossa ovalis is a dangerous procedure. Aside from the complications noted after such ligature by authors of præ-antiseptic days, the work of Braune demonstrates the existence of valves in all veins given off at the fossa ovalis. These valves open toward the common femoral. This valvular arrangement gives the common femoral the importance of the only vessel relieving the lower extremity of return circulation, and strictly speaking, the common femoral has no collateral branches. In anomalous absence or insufficiency of valves, the internal circumflex vein may play the role of a collateral vessel. Again, advanced age, or chronic inflammations, or tumors, play no small role in the origin of a collateral circuit by which return blood of the thighs may find its way backward through veins of the pelvis. In his experiments, the author found that a pressure of even three meters of water was not always adequate to overcome the resistance of the valves above mentioned. In advanced age ligature of the femoral is less dangerous. Aside from the circuli venosi established by Braune, there exists, according to the author, a third, the circulus venosus sub tubere ischii.—*Archiv. f. Klin. Chir.*, Bd. 36 heft 3.

HENRY KOPLIK (New York)

REVIEWS OF BOOKS.

UEBER DIE KRIEGSCHIRURGISCHEN HILFELLISTUNGEN IN DER ERSTEN UND ZWEITEN LINIE. VON DR. ALEXANDER FRAENKEL, *Wiener Klinik*, 11 and 12 Heft. Wien. 1887. Urban und Schwarzenberg; New York, G. E. Stechert.

ON THE SURGICAL AID TO BE RENDERED ON THE BATTLEFIELD IN THE FIRST AND SECOND DIVISION-LINES OF THE AMBULANCE CORPS.

The author first describes the system of sanitary service in use at the present time in the Austrian army, and discusses the effects of the various projectiles now in use according to the latest investigations of the subject.

Next, discussing the wound-treatment in the line of the enemy's fire, he maintains that all gun-shot wounds are *per se* aseptic, and the main indication is to keep them so. For the first dressing, which every soldier is to carry with him ("verband päckchen"), he endorses iodoform gauze. In case of hemorrhage constriction is to be applied by the litter bearers.

Thirdly, he sketches the work of the surgeons at the bandaging station, where the wounded are to be made ready for transportation to the field-hospital. All wounds not yet dressed are here covered with occluding (iodoformized) dressings, and fractures are immobilized.

Finally, the field-hospitals are described situated 3 or 4 (German) miles behind the line of battle. In this chapter the author reviews the different methods of dressing the wounds in various conditions, and adds numerous remarks as to the prognosis and treatment of the many injuries occurring on the battle-field.

The paper is written in a manner that can be understood by the general medical reader, all military technical terms being explained. A map showing the position of the various sanitary and ambulance stations on the battlefield accompanies the pamphlet.

DIE VERLETZUNGEN DER OBEREN EXTREMITÄTEN. II. Theil. By Prof. Dr. BARDENHEUER. *Deutsche chirurgie*, Lieferung 63. b. 1888. Stuttgart, Ferdinand Enke. New York, G. E. Stechert.

INJURIES OF THE UPPER EXTREMITIES.

This volume of over 500 pages and uniform with the rest of the series, contains the dislocations of the elbow, of the wrist and fingers, the fractures and displacements of the bones of the forearm, and the injuries, contractures, and traumatic inflammatory processes of the hand and fingers.

The subjects are treated with the completeness of detail characteristic of the series. The literature given occupies alone 71 pages of fine print. In the anatomy and pathology of each subject the newest experimental researches (such as those of Schuller) have everywhere been considered. The symptomatology has been elucidated by woodcuts. In the treatment operative and other methods are fully discussed.

The chapter on the fracture of the lower epiphysis of the radius (46 pages) deserves especial mention. The author condemns splints as well as all plaster-of-Paris bandages, and enthusiastically recommends extension for all cases of Colles' fracture. This necessitates keeping the patient in bed, but the duration of healing is shortened to 10 or 14 days. 80 cases treated in this manner showed eminently satisfactory results.

UEBER UNGLÜCKE IN DER CHIRURGIE. Von J. N. VON NUSSBAUM. 1888. Leipzig, Wilhelm Engelmann; New York, G. E. Stechert.

ON MISFORTUNES IN SURGICAL PRACTICE.

Prof. von Nussbaum, of Munich, originally published the subject matter of this pamphlet (42 pages) as a tribute to the objective and truthful life-work of Albert von Kolliker. In contra-distinction to the greater number of surgeons who, from vanity, only publish their successful cases, the author has endeavored to collect in the present article all the mishaps that have occurred to him in the surgical experience of 27 years.

The subject is divided into mishaps during narcosis, and mishaps after injuries and during operations.

Not only are the accidents which may occur at such times enumerated, but we are told how best to meet them, and what to do in each

case. Every page is full of practical hints of the greatest value to the surgeon, and the whole is written in such a straightforward and simple manner that it is fascinating to read. The only objection is that the reader finds each subject too briefly treated.

ÜBER OSTEOKLASIE. By FELIX BUTTERSACK. 1887. Berlin. Gustav Schade; New York, G. E. Stechert.

ON OSTEOCLASIS.

This inaugural dissertation gives a short history of osteoclasia, descriptions of the newer instruments (with cuts), and finally compares osteoclasia with osteotomy to the advantage of the former. Experiments on the cadaver are given.

W. W. VAN ARSDALE.

ON THE OPERATION OF GASTROSTOMY, WITH A REPORT OF A SUCCESSFUL CASE.

By W. B. ROGERS, M. D.,

OF MEMPHIS, TENN.,

PROFESSOR OF PRINCIPLES AND PRACTICE OF SURGERY, AND CLINICAL SURGERY
IN THE MEMPHIS HOSPITAL MEDICAL COLLEGE.

THE patient was a male, white, æt. 24, from Craighead Co., Ark., named Arnold Duke, brought to me by his physician, Dr. T. H. Jones, on the 18th of May, 1888. One year *previous* to that date, he had, through mistake, swallowed about half an ounce of a solution, supposed to have been of concentrated lye, which produced intense burning in his pharynx and œsophagus, with vomiting of blood. Throat was very sore for some days, with great pain and difficulty in efforts at deglutition. He soon went to work, but it was not long before his health began to fail; constant and increasing difficulty was experienced in swallowing solid food, and on three occasions he was totally unable to swallow either solids or liquids; once during a period of five days, again during a period of eight days, and the last time he had not been able to get down anything for ten days, in consequence of which, he was so much emaciated and weakened that he fainted from sheer exhaustion on entering my infirmary, where I saw him two hours later, somewhat revived, but scarcely able to sit up without the support of my assistant. A brief history of his case having been obtained, I attempted the introduction of a bougie. With this instrument a stricture was detected $7\frac{1}{2}$ inches from the incisor teeth. After repeated attempts with various sized instruments, I succeeded in entering the narrowed portion with a No. 6 (American size) urethral gum catheter, with a stylet. Possibly, half an inch, not more, of the catheter entered the narrowed passage. I used pressure very gently, but could pass it no further. The stylet was withdrawn, in the hope that the flexibility of the unsupported catheter would enable it to follow the tortuous canal, but this failed. I then withdrew the catheter, which was tightly grasped by the cicatricial band. A little blood-tinged mucus was spat. Even this slight dilatation afforded some relief, for he found, on trial of

water, that he could get a little down into the stomach. Milk was at once substituted, and the night was spent in sipping this food.

The morrow presented us a changed man; the wan, worn and hungered countenance was easy, and even smiled.

The age of this patient, with the history as given, together with the information obtained on my examination, precluded a diagnosis of can-



FIG. 1. AN ANTERIOR VIEW OF THE PATIENT, SHOWING THE EXTERNAL OPENING OF THE PERMANENT FISTULA.

cer of the œsophagus, or of intra thoracic tumor. It seemed clearly to be a cicatricial stricture, the result of the cauterizing fluid drunk one year before.

On each of six succeeding days, catheterization of the œsophagus was attempted—literally speaking—trying all sizes of urethral instruments, down to No. 2 gum catheter. He was very patient, and the search was faithfully made, but to no purpose. On no occasion did I succeed in finding the opening in the stricture. The point of the instrument would come to an abrupt stop, pointing sometimes to the right, and again to the left side of the contraction. Very little force was used. On three occasions, blood-stained mucus followed the exploration, and each time, much pain was produced, which lasted some

hours. Swallowing was rendered more difficult during the remainder of the day, on two occasions. He was enabled all the time to get down about three pints of milk in 24 hours, by devoting himself closely to the business.

I was forced to give up the hope of practicing dilatation, even with its attendant dangers, because of not being able to find the entrance to the narrow portion of the canal, and advised gastrostomy. Repeated examples of life being sustained for months by rectal feeding have been reported, but it seems that in cases of stricture of the œsophagus, that method of sustaining life does not meet with success. As unpalatable as is the idea of a gastric fistula, it was eagerly grasped at by my patient. He was still able to swallow liquids, and even rice and bread, finely crumbled and cooked in milk; but I advised the operation at once, instead of waiting until he became more emaciated, and was caught, as it were, in a spell of starving. He saw the wisdom of it, and consented.

Nourishment by the mouth was continued, and rectal alimentation for the first time in his case, was resorted to. Three times, in each 24 hours, one pint of milk, with beef peptonoids was thrown into his bowel.

At the end of three days, May 29th, 1888, his bowels having been thoroughly emptied by repeated salt-water enemata, and lastly injected with milk, brandy and beef peptonoids, I began the operation of gastrostomy. My assistants were Drs. T. H. Jones, Henning, Williford, Neely, Dorey and S. A. Rogers. Chloroform was the anæsthetic; time of operation, 1 hour and 10 minutes. Morphia, hypodermically, was used half an hour before anæsthetic was begun, and was repeated at from four to six hours intervals, throughout the first five days. No vomiting occurred during operation, nor until six days afterward, when nausea was caused by the odor of peptonoids.

An incision was made at the site selected by Fenger, that is, parallel with, and one inch from the left costal border. The centre of my incision was on a level with the anterior extremity of the ninth rib. The tissues down to the peritoneum were rapidly cut through, and hæmodynamic forceps applied to the few bleeding points, when the peritoneum itself was incised the full length of the wound. Two fingers were then entered and carried along the under surface of the liver, left lobe, as suggested by Segond, to the spine, where the stomach was found, and after several efforts, brought forward into the upper end of the abdominal opening. Upon repeated trials, a point was selected, which could be fastened to the abdominal wall with least tension on the organ. I then passed two long hare-lip pins parallel with each other,

half an inch apart, and transverse to the abdominal wound. They transfixed the peritoneal and muscular tunics, but did not enter the cavity of the viscus; their ends rested on the integument, and thus they held the stomach nicely in the upper angle of the incision. Possibly I should have been content with this simple apposition of the peritoneal surfaces, as has been practiced by Macnamara, but not knowing how soon the opening into the stomach might be called for, I determined to suture that organ in position, and proceeded to do so after the manner suggested by Greig Smith, and which I will briefly describe.

A straight, flat needle, armed with plaited silk, and devoid of cutting edge, one inch and a quarter in length, was passed beneath the serous and muscular coats of the stomach, and made to encircle a space of $1\frac{1}{2}$ inches in diameter, inclosing the pins already placed. As this needle was passed, it was brought out and re-entered, at intervals of $\frac{3}{4}$ of an inch, each time leaving a loop of thread protruding. The circuit having been completed, five loops and a tie presented; by means of a large, rounded needle, armed with double thread, these loops were successively brought directly through the abdominal wall at proper points. A rubber tube was then passed through each of the loops, which were, one by one, tightened, and lastly the tie was brought out and made around the tube. Thus the stomach was riveted, as it were, closely, and by elastic force, to the abdomen; leaving exposed an area about the size of a silver quarter. By the use of a rounded needle, there was no bleeding from the peritoneal punctures, and no blood entered the peritoneal cavity during the operation. The lower end of the incision was then closed, the peritoneum being first sewn with interrupted suture, then drainage tube placed, and lastly, silk-worm gut sutures closed the muscular and cutaneous layers. Dressings were applied, and the patient put to bed. No evidences of shock were manifested. Pulse never reached 100. Temperature rose slightly on the second day, but fell to normal on the fifth day; never went above 101° . Nourishment was kept up by the stomach and bowel, almost from the close of the operation. On the fourth day the pins were removed; on the eighth day the looped sutures were taken out, and rubber tubes removed; on the tenth day, chloroform was administered, and an opening large enough to admit $\frac{1}{4}$ inch drainage tube, was made into the stomach. Three days later, all the sutures were removed, and on the fourteenth day he was sitting up. On the twenty-sixth day he went home, having been detained several days, while a silver tube with shield was being made.

He left me in good spirits, and able to take a good quantity of milk and rice by the mouth, which was supplemented by feeding through the artificial mouth.

Six months after the operation the patient's general health and strength is perfect. The gastric opening is quite small, and is kept closed by means of a silver tube, which he keeps plugged. He takes nourishment through the natural channel in small quantities, and by care and patience in masticating, succeeds, but with difficulty in getting it down into the stomach. The stricture is about as when he left me five months ago.

Reviewing briefly the subject of Gastrostomy, we learn that the first proposition for this procedure comes from a Norwegian, Egebert, by name, as early as 1837. Sedillot first practiced it of his own accord, two years later, performing three operations, the last, probably, in 1853, all three patients dying within a fortnight.

During the succeeding 20 years, various operators failed to save a patient, and so unfavorable were the results of the few cases then reported that in 1864 the great mind of Gross heartily condemned the operation in malignant disease, and could only admit a possible good in non-malignant contractions of the œsophagus.

Erichsen, almost as late as 1873 barely concedes it a justifiable procedure in cicatricial strictures. One year later, 1874, Sydney Jones, after two unsuccessful operations, scores the first success, as published in 1876.

Agnew is most disparaging in his remarks on this subject as late as 1878.

Statistics on this operation, as given four years ago, by S. W. Gross, showed a mortality of 29.47% in a total of 207 mixed cases. The same report gave a mortality of 29.34% in 167 operations for cancerous stricture, against 29.72% in 37 cases of cicatricial stricture of œsophagus. Such figures are rather puzzling, and at the same time suggestive that the cases of cicatricial stricture fell to the hands of novices in surgery, while the malignant cases, with a presupposed unavoidable heavy mortality, fell to the hands of experienced operators, and thus the figures nearly balanced. Gross' figures still fur-

ther surprise us with the show of the heavier death rate from septicæmia, peritonitis and accidents, when the operation was for cicatricial stricture. The death rate was about equal from shock in the two classes of cases; but as was naturally to be expected, the mortality from exhaustion and starvation, was higher in malignant strictures. On the whole, the death rate at the end of the first month, was 70% in malignant, against 54% in non-malignant cases. This 70% is quite a bad showing, especially when it is remembered that prolongation of life was all that could be hoped for. Few will argue that so grave an operation should be advised for a month's lease of life, which at best, would be under the worst of circumstances. It is true, the operation itself is the same, whether demanded by malignant or non-malignant cause, but the lowered vitality in later stages of malignancy should come in as a factor in the death rate. Indeed, while the operation is practically so young, it is difficult to draw any just conclusions about its mortality. A death rate based on the first few hundred operations performed helter skelter by experienced and inexperienced hands, has, in the past, done much to retard the onward progress of many important and life-saving steps in surgery—the operation often suffered while the fault was with the operator; such was doubtless true of gastrostomy. But at the present writing, so often repeated have been the successes reported, in both malignant and non-malignant cases, that the tide of surgical sentiment has changed, and the operation has a recognized reputable standing among major operations.

The object and aim of the procedure is, in all instances, the prevention of starvation, but writers recognize two classes of cases.

First, Those, where by reason of the malignancy of the very cause demanding the step, life can, at best, only hope to be prolonged for a very brief space—the wolf only driven from the door, while the jackal within devours the household.

Second, Cases in which starvation is the sole threatening to life.

In this first class of cases, especially when rectal feeding fails to support, and the pangs of hunger cannot be appeased, I consider it inhuman to withhold the chances of even tem-

porary relief from these sufferers, and it were well not to postpone the step too long. In the latter class the outlook is most cheering, and with the improved aseptic practices and steadily increasing familiarity with abdominal surgery, the prediction has been ventured that at an early date the mortality will compare favorably with that of oophorectomy.

The operation itself needs next to be considered, and may be described as consisting of three periods: First, the opening of the abdominal cavity; second, finding and fixing the stomach in the opening; third, the opening into the stomach. Of the several lines of incision proposed and practiced by various operators, to my mind, the choice lies between the vertical incision through the rectus, near the outer border of that muscle, as practiced by Howse; and that of Fenger, which was followed in my case, reported above. The incision of Howse will perhaps be awarded the first place, when the stomach can be distended preparatory to the operation, so that the viscus bulges well into the floor of the wound, and all that needs be done is fixing it there. Another great advantage of Howse's line, is, that the contracting fibres of the rectus form more or less of a sphincter to the fistula—quite a desideratum for the patient's after comfort; but as in my case, where dilatation of the stomach was not practical, and that organ had to be searched for, Fenger's incision perhaps answered a better purpose for manipulation. It is true, we can get along with a short incision when the organ is distended, but I do not think the extent of the incision within reasonable limits, influences the death rate in any abdominal section—plenty of room for the untrammelled performance of the operation is desirable.

The advantage of having a dilated stomach is deprecated by Smith, claiming the worst can be known in regard to tension, only, when the organ is empty.

In considering the various methods of fixing the stomach in the incision, we are confronted with the question: When will you open the stomach; at once, or will you wait for peritoneal adhesions? Circumstances should govern us in each case. In this age of surgical advancement, instances should be rare where starvation has reached such a point that the rectum

cannot be relied upon to support the patient for 24 hours. Whenever practicable, the delay of the final step until union has taken place between the stomach and margins of the abdominal opening, is, on the whole, a safe course. On the other hand, some operators prefer immediate completion of the operation. Whether such a rule will be universally adopted, experience only will tell.

When delay is advisable, the plan of transfixing the two outer coats with hare-lip pins, is surely the simplest, and the experience of Macnamara tells us, is all sufficient, but the temptation to render all doubly secure, is very great, and few seem able to resist putting in a few stitches—"They often err in doing too much."

If an immediate gastric opening is demanded, the stomach is first carefully stitched to the abdominal opening, preparatory to the final step, which under such circumstances is exceedingly simple; an incision through its outer and middle coats is made, then the inner coat perforated with a small pair of forceps, by means of which a tube is entered and liquid food injected. When several days have elapsed the entire field is covered by layers of lymph, and some care is requisite not to cut too deeply. In the contracted state of the organ transfixion of both walls might easily occur; hence, I incised layer by layer, until the muscular coat was recognized and cut through, then used the forceps. In either instance a large opening is what must be guarded against. Gerster says one of his cases died of starvation, due to escape of gastric contents.

REPORT OF SIXTEEN CASES OF LAPAROTOMY.¹

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OF ST. LOUIS,

SUPERINTENDENT OF THE CITY HOSPITAL.

THE following is a report of the cases of laparotomy done by me in the St. Louis City Hospital, during the past two years :

¹Read before the Mississippi Valley Medical Society at St. Louis, Mo., September 26, 1883.

CASE I.—SUPPURATIVE APPENDICITIS; INCISION; REMOVAL OF ULCERATED APPENDIX; RECOVERY.—Frank S., Bohemian, æt. 23, hodcarrier, entered the hospital June 28, 1888, with the following history :

Always enjoyed good health until last winter, when he had an attack of five or six days duration, somewhat similar to, though not so severe as, the present trouble.

Present illness began five days before admission with loss of appetite, pain in abdomen, and diarrhœa. He continued to work for a day and a half in this condition, when intense pain compelled him to cease. The pain and diarrhœa continued until admission to hospital. The day before admission had but one stool, was chilly, and vomited several times; pains became more agonizing, thirst great, which when quenched caused vomiting.

Examination revealed dullness on percussion in right iliac region and some prominence at this point, but no well defined tumor; some tympanites elsewhere over abdomen. The finger, passed into rectum felt a tumor in the right iliac fossa. Copious enemas gave a stool of fair consistence.

At 7 A.M., next day, I operated, assisted by Dr. N. B. Carson and the hospital staff. The incision was about three and a half inches in length, commencing an inch above Poupart's ligament, and extending upward and slightly outward over the most prominent part of the swelling. In cutting through the skin I came upon an indurated mass, which proved to be the thickened wall of the pus cavity. About three ounces of very foetid pus escaped. After satisfying ourselves that the cavity did not connect with the general peritoneal cavity, we irrigated it with a $\frac{1}{1000}$ solution of bichloride of mercury. The appendix was found at the bottom of the cavity, half buried in the underlying inflamed tissues, and strongly adherent to same; so much so that it required considerable force to tear it from its bed. Lying just outside of the ulcerated appendix, within the pus cavity, was a hardened fecal concretion about half an inch in length and one-eighth of an inch thick, which was doubtless the cause of the trouble. Large catgut ligature was thrown around the appendix, close to the gut, and the appendix cut off. The specimen is nearly or quite an inch and a half in length by an inch in width and thickness. It is curled upon itself like a pig's tail.

In enlarging the incision in the cavity downward, I cut the deep epigastric artery which bled very profusely, but fortunately I was able to catch it with forceps upon the first attempt. After thoroughly

curetting and washing out the cavity with a hot $\frac{1}{1000}$ solution of bichloride of mercury, a glass drain tube was put in and the cavity filled with sublimate gauze, in the meshes of which, iodoform had been thoroughly rubbed. The forceps compressing the artery were left *in situ*.

Wound dressed on second day. Tube and forceps removed. Wound found in sweet aseptic condition. It filled up rapidly by aseptic granulation. The temperature was never elevated a degree above the normal. He was discharged well August 31, 1888.

CASE II.—PENETRATING GUNSHOT WOUND OF ABDOMEN; HYDROGEN TEST; ENTERECTOMY; INTESTINAL SUTURE; DEATH.—Tim. M. Irishman, fireman, æt. 29, was shot two hours before admission on July 8, 1888, bullet entering two and a half inches to left of median line and four inches below umbilicus. He was suffering intense pain; temperature 100° ; pulse 98; respiration 24. Pain referred to epigastrium. He had been a very hard drinker and was drunk at the time of injury. He vomited very soon after being shot, and made several ineffectual attempts to do so when put upon the operating-table.

After consultation with Drs. McCandless, Lutz, and Meisenbach, I made preparations for laparotomy. We concluded to try Senn's hydrogen gas test, Drs. Meisenbach and Lutz applying it. The experiment was a perfect success—the gas escaped freely through the glass tube in the wound and ignited readily. Median incision six inches in length. Abdomen greatly distended with gas which separated the intestines from the abdominal wall, and when the peritoneum was cut through the gas escaped with a loud report.

Examination revealed fifteen holes in the small intestine. It was considered advisable to make two V-shaped sections, involving both gut and mesentery. The sections were each three inches in length, in one of which there were six holes and in the other five. Besides these there were two other coils perforated, giving four other holes, the latter of which were closed by Lembert sutures, iron-dyed silk being used. As the patient was in a bad way, and time being a great desideratum, we used continuous iron-dyed silk suture to the V-shaped sections. The abdomen was, from time to time, flushed with hot sterilized water, 108° or 110° F. The great number of perforations involved a great length of time for their closure—over three hours. Patient was collapsed and died in an hour after leaving the table.

I think it may justly be claimed that this case was the second in which Senn's method was used. One or two other cases

have been reported, but, I believe they occurred subsequently to mine, which as above stated was on July 8, 1888. Dr. Wm. Mackie, of Milwaukee, was the first to use the method, the report of which occurs in the *Medical News* of June 9, 1888. In my case the method was more successfully demonstrated than in his, for in his case the escaping gas did not ignite. He stated that "on firmly compressing the abdomen there occurred an intermittent escape of gas, mixed with blood, through the wound of entrance," which he said would not ignite because "a burning match never once happened to be directly over the wound of entrance when the gas was escaping."

Without an operation no one would claim that the above case could have recovered. The patient, however, might possibly have gotten well had the operation been performed more rapidly; but those who have not done this operation can hardly conceive the length of time it takes, or the many difficulties one encounters in its performance.

A great deal of time can be saved in making V-shaped sections, by using the method suggested by Dr. H. H. Mudd, reported in the *Journal of the American Medical Association*, August 11, 1888. I can testify to this as I assisted the doctor in a laparotomy for a penetrating stabwound of the abdomen, cutting the intestines, in which he used this method.

Senn's decalcified bone plates or rubber tubes might very greatly shorten the time of the operation.

CASE III.—PENETRATING STABWOUND OF ABDOMEN, STOMACH PROTRUDING; RECOVERY.—Dan. C., colored, æt. 28, fireman, admitted 12:55 A. M. August 17, 1888. Was stabbed three hours before admission. He was in great agony, and greatly depressed; pulse weak and rapid; temperature 99.6° F. The wound was situated two inches below the ensiform cartilage, a little to the left of the median line. It was one inch in length. Two thirds of the stomach protruded. The organ was dark blue, almost black, and covered with dirt, the discoloration being due to its constriction by the narrow wound through which it passed.

Assisted by Dr. A. H. Meisenbach, and the hospital staff, I enlarged the wound sufficiently to replace the stomach, after which he vomited a large amount of blood, showing penetration of the organ. The med-

ian incision was enlarged to perhaps three inches, and the wound of stomach sought for, which proved to be very small, not more than a quarter of an inch on its anterior surface. The probe passed through the serous and muscular coats, but failed to penetrate the cavity. I presume the mucous membrane acted as a valve and prevented its entrance.

There was a small amount of blood in the peritoneal cavity which was mopped out with sponges wrung out in a solution of $\frac{1}{10000}$ bichloride of mercury. The wound was closed by interrupted silk sutures, each involving the skin, muscles, and peritoneum. It was dressed antiseptically; opened on the eighth day and found healed by first intention. His pulse and temperature never reached 100, except on one afternoon. No drainage tube used. He was nourished by enemata for ten days, nothing allowed by stomach. Discharged well September 6, 1888.

CASE IV.—PENETRATING STABWOUND OF ABDOMEN, OMENTUM PROTRUDING. RECOVERY.—Mortimer J., colored, *æt.* 30, laborer, admitted 12:55 A. M. August 17, 1888. Was cut three hours before admission. Was suffering considerable pain, but little shock; pulse 98, temperature 101 F. The wound was situated at the intersection of the tenth intercostal space with the left axillary line. It was enlarged, omentum returned, and a small amount of blood sponged from cavity.

The finger introduced came in contact with the kidney and the spleen. Neither organ was injured. Glass drainage tube put in, and the wound packed for two days, after Bergmann's method, when it was redressed and sewed up. Drainage tube replaced by a small rubber tube.

Wound healed by first intention, and patient discharged well September 6, 1888.

This patient had to wait until Case III was attended to, and this may account for the rise of temperature.

CASE V.—INTUSSUSCEPTION; LAPAROTOMY ON THIRD DAY; DEATH.—Armogast G., *æt.* 42, dairyman, admitted at 8:20 P. M., June 5, 1888. Occupation required him to frequently assume the stooping posture. Two days before admission he was suddenly seized with an acute, agonizing pain in the epigastric region, which came on shortly after supper. An hour or two after he vomited freely. This condition continued periodically until he came to the hospital. Bowels had not moved since inception of illness. His pulse was 78, temperature and respiration normal; complained of intermittent pain in abdomen, and

some tenderness on pressure over epigastrium. An enema brought away a large quantity of hardened feces. A dose of morphine and warm applications relieved pain for the night.

He vomited but once the next day, and there was less pain and tenderness, which was always referred to the epigastrium. His condition remained the same for the next two days; bowels, however, did not move.

On the morning of the third day I found him in great pain; abdomen distended, tympanitic, and quite tender to pressure; pulse rapid; temperature 100°F .; countenance anxious. There was some dulness on percussion in the hypogastric region.

As laparotomy was now the only alternative I concluded to give him that chance. Upon opening the abdomen, median incision, the intestines were found very much discolored and matted together. An intussusception of about two inches was found in ileum about three inches from cæcum. The intussusceptum was gangrenous in two places. The spots were circular in form, parallel to the gut, and each about a half inch in diameter, with a half inch of healthy tissue intervening.

As the patient was too much depressed to stand the resection of the gut, the serous surfaces were brought together over the gangrenous portions by Lambert's suture. I concluded that there would not be too much narrowing after the use of this method. The patient never rallied and died three hours after the operation.

Here was a case which could almost certainly have been saved had an earlier operation been done, but procrastination on my part cost him his life. I was deceived by his fair general condition for a day or two, and I also thought that as his bowels had moved from the enema there might possibly be no obstruction. However, we may have several fecal actions from the lower bowel and still obstruction may exist higher up.

I have reproached myself very much for the result in this case, and the lesson I learn from it is that delays are dangerous, that if we expect to save cases of acute intestinal obstruction, we must open the abdomen, early, find and relieve the obstruction and close the belly as rapidly as possible.

CASE VI.—PENETRATING STABWOUND OF THORAX, DIAPHRAGM, AND

ABDOMEN, HERNIA OF OMENTUM THROUGH DIAPHRAGM; SUTURE OF DIAPHRAGM; RECOVERY.—Peter F. Irish, *et.* 22, horse shoer, admitted August 4, 1888. Six hours previously was stabbed in left side, the knife penetrating between the seventh and eighth ribs in the axillary line and passing through the diaphragm. The wound through thoracic wall was about an inch in length, that in the diaphragm about three inches. The lung was not injured; expiration was probably taking place at the time, hence the lung was well up in the thorax and out of the way.

The wound had previously been sewed up at the dispensary, but as the patient was suffering a great deal of pain, I reopened the wound and enlarged it which enabled me to see the omentum protruding through the diaphragm. I was compelled to resect four inches of the seventh rib in order to get sufficient room to replace the omentum, and sew up the wound in the diaphragm. The diaphragmatic wound commenced an inch from the thoracic wall and extended three inches toward the median line. It was very unhandy to sew up owing to its location, and the constant up and down motion of the diaphragm during respiration. It was closed with the heaviest catgut, interrupted, suture. The thoracic cavity was irrigated with warm sterilized water, drainage tube introduced, and the external wound packed for two days with antiseptic gauze. Tube and dressing removed on the third day; wound dressed antiseptically, and healed by aseptic granulation. Patient discharged well August 4, 1888.

CASE VII.—PENETRATING WOUND OF THORAX, DIAPHRAGM AND ABDOMEN; SUTURE OF DIAPHRAGM; RECOVERY.—Nettie S., American, *et.* 24 years, admitted at I. A. M., August 5, 1888. Patient jumped from a window a distance of six or eight feet, falling upon a picket fence, picket penetrating left side. Examination revealed a wound two, or two and a half inches in length in left axillary line between the eighth and ninth ribs, through which omentum and three or four inches of small intestines protruded.

The wound, of course, passed through thorax and diaphragm into abdomen. She was drunk at the time of injury.

When admitted had a temperature of 100° F., pulse 110, suffering great pain. After enlarging the wound to three inches a thorough examination failed to discover visceral injury.

After sponging out a large quantity of blood from peritoneal cavity, I sewed up the diaphragm with heavy catgut suture, the ribs being sufficiently separated at this point to allow me to do so. A rubber drainage tube was put in thoracic cavity, and the wound packed with sublimate gauze, on which iodoform had been thickly sprinkled

Her pulse ranged between 115 and 120 for four days, the temperature above 100° for a week, after which time both fell to normal and remained there. As there was a large amount of serous discharge from thoracic cavity, I was not able to sew up the wound until the fourteenth day, when it all healed by first intention except the part occupied by small rubber drainage tube. This was removed within the next three or four days and the wound left healed by aseptic granulations. She was discharged well August 27, 1888.

I thought it rather remarkable that the wound should heal by first intention after being left open till the fourteenth day. The term thoraco-laparotomy would, perhaps, be more appropriate in these cases.

CASE VIII.—SUPPURATIVE PERITONITIS FOLLOWING PERFORATING ULCER OF STOMACH; ABSCESS OF LEFT KIDNEY; DEATH—Henry R., colored, æt. 40 years, laborer, was admitted May 18, 1888. Had suffered seven weeks with gastric disturbances; had chills irregularly, vomited occasionally about an hour after eating, had frequent gastralgia and anorexia. Claimed to have lost sixty pounds of flesh in the seven weeks illness. Bowels alternated between diarrhœa and constipation. For a week before admission bowels were somewhat loose, stools quite dark.

One week after admission at 12:30 A. M. the assistant was called and found patient suffering intense agony. In umbilical region pressure gave great pain. Pulse 110, temperature 102° F. The doctor gave one-fourth of a grain of morphine hypodermically, and five grains antifebrin, per rectum, and applied cold applications. When I saw him next morning, the 27th, there was general peritonitis, abdomen distended, tense and tympanitic, great pain on pressure; vomited bilious matter.

Perforating ulcer of stomach followed by general peritonitis was diagnosed, and laparotomy determined upon. Assisted by Drs. N. B. Carson, Lutz, Meisenbach, McCandless, *et al.* I made a median incision from ensiform cartilage to umbilicus. When peritoneum was incised a considerable quantity of sero-purulent fluid escaped. The intestines were very much distended. Several small fistulous tracks were found, near together, on lesser curvature of stomach about three inches from pylorus, surrounded by a mass of thickened inflamed tissue. We were unable to pass a probe into stomach through the fistulous tracks.

Being unable to locate the ulcer, and feeling certain that one existed, we deemed it advisable to make a small opening into the organ

which enabled us to see it very plainly. It was situated an inch from the fistulous openings, was circular in form, and about half an inch in diameter. It seemed to involve the mucous membrane and muscular coats only. We failed to discover the perforation. It had doubtless been closed by inflammatory action.

As the patient was now almost moribund, and thinking he would not survive long enough to enable us to excise the ulcer, we deemed it best to finish the operation as rapidly as possible. The wound we had made in stomach was closed by Lembert sutures. The serous surface over the fistulous tracks was brought together by the same method. The abdomen thoroughly washed out with sterilized water, a rubber tube put in and wound closed. Patient died three hours after operation.

At the post-mortem fourteen hours after death, the upper third of left kidney was found to contain a large abscess which, however, did not connect with the pelvis of the kidney, nor with the ureter, as neither contained pus.

CASE IX.—TYPHILIS; GANGRENE OF CÆCUM; ARTIFICIAL ANUS; DEATH.—LOUIS T., Italian, laborer, æt. 37 years, admitted August 13, 1888. Was never sick until this attack. Had been a steady drinker for a number of years. Hygienic surroundings poor. Present illness commenced three weeks before admission, with headache, general malaise, frequent chilly sensations, loss of appetite, and pain in epigastrium. Two weeks ago pain increased in severity, and diarrhœa set in, which soon developed into acute dysentery. He had taken quinine and drastic purgatives.

The symptoms did not differ from those of an ordinary case of acute dysentery, and was considered such until the 20th, one week after admission, when he complained of severe pain in right iliac region, examination of which revealed dulness and great pain on percussion also marked fulness, though no well defined tumor. Examination, per rectum gave no evidence further than a ragged ulcer, which could just be touched with the tip of the fingers. His pulse was 120, temperature 102 F. I cut down upon cæcum and found a gangrenous spot about two inches in diameter, situated on anterior surface, and very close to ileo cæcal junction. The appendix was not involved. If obstruction existed I could not find it, nor could I account for the gangrene, possibly it may have been due to dysenteric ulceration, though I am not aware that such ulceration has ever been followed by gangrene.

As it was thought I could not excise the diseased part and close the gut without too much narrowing, I concluded to make an artificial

anus, which I did by excising the gangrenous part, and sewing the opening to the abdominal wall. Patient did not rally and died eight hours after operation.

Post-mortem ten hours after death showed colon, from cæcum to rectum, studded with many ragged, irregular, dysenteric ulcers. This operation was done too late, but there was nothing to call special attention to the cæcum till time of operation.

CASE X.—PENETRATING STABWOUND OF ABDOMEN; INJURY OF SMALL INTESTINE; INTESTINAL SUTURE; DEATH.—Richard J., colored, æt. 69, laundryman, admitted April 28, 1888. Wound inflicted three hours previously. It was three inches below umbilicus, and three inches to right of median line. Patient was in fair condition, except that he was suffering excruciating pain. Two inches of slightly discolored omentum was protruding from wound, which was covered with clotted blood.

After thorough antiseptis a median incision was made from umbilicus to two inches from symphysis pubis. Three small holes were found in small intestines, very close together, which were closed by Lembert's sutures. A large amount of blood was found in cavity, which was thoroughly cleansed and closed; glass drainage tube left in. Patient did well for twenty-four hours, when vomiting, hiccough, etc., supervened. He died thirty-one hours after operation. He was a frail, white-haired old man.

CASE XI.—PENETRATING STABWOUND OF ABDOMEN; RECOVERY.—John D., Amer., æt. 26, laborer, admitted July 31, 1888. Injury received two hours before admission. Wound in right axillary line two and a half inches above anterior superior spine of ilium. As there was considerable hemorrhage, I enlarged wound, sponged out the blood and irrigated cavity with warm sterilized water. Senn's hydrogen test was applied, but gave negative results. Wound sewed up, glass drainage tube left in.

Patient stood the operation well. Next morning temperature was 104° F., pulse, 100; wound was redressed; dressing found to be full of sanguinolent fluid. Tube taken out and absorbent gauze applied. He was given a large dose of salts. After this he made a rapid recovery. Wound healed by first intention.

CASE XII.—PENETRATING STABWOUND OF ABDOMEN; RECOVERY.—Louis P., colored, æt. 22, laborer, admitted April 27, 1888. One hour previously received a stabwound which penetrated the abdominal cavity on right side, at a point midway between umbilicus and anterior superior spine of ilium. His pulse was but little elevated; temperature 99.5° F. Patient was very drunk and boisterous.

Median incision from umbilicus to three inches below. Intestines were not injured, but little blood in abdomen, which was thoroughly cleansed and closed. No drainage tube used. Patient did badly after operation for several days, after which he slowly convalesced, and was discharged well May 29, 1888. Wound healed by first intention.

CASE XIII.—PENEETRATING STABWOUND OF ABDOMEN; DEATH.—Wm. P., colored, æt. 24, laborer, admitted June 3, 1887. Four hours before admission was stabbed with a small knife, he being drunk at the time of injury. Walked several blocks to a physician's office, who applied a bandage and sent him to the dispensary, from whence he was sent to the hospital.

Was suffering from shock and intense pain at the site of wound, which was half an inch in length, and was situated one inch to the right of umbilicus; omentum protruded from wound. I enlarged the wound to three inches. Small quantity of blood removed from cavity, no visceral injury; wound was closed. Patient did badly and died thirty-six hours after operation, having never recovered from the shock following the injury.

CASE XIV.—STRICTURE OF DUCTUS COMMUNIS CHOLEDOCHUS; CHOLECYSTOTOMY; DEATH.—Joseph G., German, æt. 45, laborer, admitted July 5, 1888. Patient had been a hard drinker for years. Had suffered for many months with pain and swelling in right hypochondriac region. He was extremely jaundiced and emaciated. Pulse, 48; temperature subnormal; inclined to great stupor; could be aroused with difficulty.

Examination revealed a large, movable, fluctuating tumor two inches to the right of median line, and extending from border of liver to a point three inches below umbilicus. Distended gall-bladder was diagnosed.

I made an incision, four inches in length, over the tumor parallel to the median line. A large white glistening gall-bladder came into view. After removing it from the abdominal cavity, an incision brought away a pint and a half (750 c.c.), by actual measurement, of slightly gelatinous, colorless fluid. After diligent search we were unable to find the cause of the obstruction. The bladder was sewed to the abdominal wall, making a biliary fistula. Patient was almost moribund when put on the table, and should not have been operated upon. It was done as a *dernier ressort*. The result, however, should not militate against the operation of cholecystotomy.

Autopsy one hour after death showed common gall duct very much dilated throughout, up to within an inch and a half of the

duodenum. At this point was found a circular cartilaginous ring, or stricture, which completely occluded the lumen of the duct, which accounted for the obstruction. The stricture was caused by inflammatory action, probably an enteritis traveling up the duct. The large amount of fluid in the gall-bladder was remarkable; however, very much larger quantities have been removed, in fact, many quarts, if we may believe the cases reported.

The two following cases were operated upon after the meeting of the Mississippi Valley Medical Society at which the preceding cases were reported :

CASE XV.—STRANGULATED INGUINAL HERNIA; RECOVERY.—J. M., colored, æt. 25, laborer, admitted October 2, 1888. Had always been healthy until four weeks before admission, at which time he had intermittent fever, quotidian type, which lasted two or three weeks.

Five days before admission had paroxysmal pains in the region of the umbilicus which came on suddenly and after a day or two became continuous, darting down into the left iliac fossa. His bowels had not moved for five days; he vomited a great deal during that time.

When admitted, complained of great pain in abdomen; belly tympanitic, great tenderness on pressure over the entire abdomen, more marked in left inguinal region. He vomited very often; ejecta had the odor of rotten meat, and was very suggestive of feces. Temperature but slightly elevated, pulse 90 and weak, respiration 36 and shallow.

A slight elevation was observed in left inguinal region, but not sufficient to enable us to feel a hernial protrusion. I, however, gave that diagnosis, and proceeded to perform laparotomy. Incision from umbilicus to four inches below. Passed hand to left inguinal region and removed from intestinal ring about half an inch of intestine, which was quite firmly adherent. The hernia was of the Littre variety, only one wall of the small intestine being involved. The invaginated portion was discolored, but not gangrenous. Intestines above the hernia were quite red and contained numerous lymph flocculi. Several feet of the intestine, together with the omentum, escaped from cavity, and as they were greatly distended, were put back with difficulty. There was a large quantity of serum in the abdominal cavity, which was mopped out with sponges wrung out in a weak solution of bichloride of mercury. Glass drainage tube left in lower angle of wound. Wound closed by interrupted heavy silk sutures, involving the skin, muscles and peritoneum. Wound dressed antiseptically.

Patient's temperature never exceeded 100° F. Several tablespoonfuls of serum were removed daily from tube. He was operated on a few hours after admission, and to this, as much as anything else, I attribute the successful result. The tube was removed on the fourth day. Bowels did not move until the fourth day, when he had several large actions. He was given a large dose of salts twenty-four hours after operation which did not act, but gave him very great pain. I was afraid to repeat the experiment, and as he did so well, I did not deem it advisable.

Wound healed by first intention. Patient is now well.

CASE XVI.—CHOLECYSTOTOMY—RECOVERY.—L. K., Austrian, æt. 34, gardener, admitted September 21, 1888. Health was always good until recently; had had intermittent fever for several months; has been a hard drinker for some years; also uses tobacco to excess.

Present illness commenced six days before admission with great pain in hepatic region. Three hours after admission he was suddenly seized with a stabbing pain in the hepatic region. Vomited frequently a green colored liquid. The pain was intense; could not bear the least pressure over right hypochondrium. He was very greatly jaundiced. Pulse and respiration accelerated. Temperature, 99.5° F.; thirst excessive; bowels loose. Percussion gave increased area of dulness over gall-bladder.

On Sept. 23, two days after commencement of the pain I performed cholecystotomy. Incision four inches in length, two inches to the right and parallel to the linea alba. The gall-bladder was very greatly distended, very tense, and was of a livid color. The entire posterior portion was firmly adherent to the subjacent tissues. These adhesions were broken up, and an unsuccessful attempt made to find gall-stones, or the cause of the obstruction. It was deemed best to sew the gall-bladder to the upper angle of the wound, which I did by taking several stitches involving the serous and muscular coats, and attaching them to the abdominal wall. The broken up adhesions bled freely. This was packed with antiseptic gauze, the ends of which protruded from the wound.

On the second day the adhesion of the gall-bladder to wound being sufficiently firm, I incised it, letting out about two ounces of very thick, black, inspissated gall. Neither the fingers nor the probe could discover the cause of the obstruction. I believe that there was acute inflammation of the gall-bladder, closing the ducts, and to this I attribute the obstruction. The gall-bladder was washed out with a hot weak bichloride solution. On the second day the gall assumed its normal appearance and flowed very freely.

At present, three months after the operation, his color is normal, appetite good, bowels regular.

The fistulous opening in gall-bladder closed on the twenty-seventh day, two days after which the feces assumed a normal color.

This list includes sixteen cases of laparotomy done by me to date—seven deaths and nine recoveries. If to these be added a successful case of gunshot wound of the stomach and liver, reported to the Missouri State Medical Society in April last, and published in the *ANNALS OF SURGERY* for August, and an unsuccessful case for perforative peritonitis following syphilitic ulceration of descending colon, reported to the St. Louis Medical Society last winter, my list will comprise eighteen cases—eight deaths and ten recoveries.

REPORT ON THE TREATMENT OF CLUB-FOOT BY MEANS OF THE THOMAS WRENCH.¹

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I DESIRE simply to report some cases with presentation of the apparatus employed, which is known as the Thomas Wrench, for forcibly correcting club-foot at one sitting, or if that is not necessary, take other sittings. The apparatus consists (see Fig. 1) simply of a modified monkey-wrench on a large scale, with arms jutting out from the side, which arms are controlled by a screw, and which take hold on the foot over the astragalus at one point, and in the plantar arch at the other point of pressure. The foot is placed in the wrench and the screw tightened, then the arms brought in close proximity until we get a good purchase or grip, then by means of the lever you can bring an ordinary club-foot, or the kind of

¹Read before the American Orthopedic Association in Washington, September 1888.

club-foot we are familiar with—viz., the relapsed club-foot, the uncured cases—into a good position.

I think it will be agreed that the majority of cases of club-foot we have to treat are those that have been under various forms of treatment, that we fancy we have cured ourselves on former occasions, and find on looking the matter over again,



FIG. 1. THE THOMAS WRENCH.

there is still some defect; we do not get the foot into a good normal position. We get the equinus corrected, perhaps, but the varus is left over, the child walks pigeon-toed, and our attention is not kept closely riveted on the child; we find it rolling after a few months on the other side of the foot, the inner side of the foot coming up. It does not take long to thus acquire one of these relapsing cases. Dr. Bradford has drawn our attention to this in the presentation of his tarsal plates; Dr. Morton, of Philadelphia, likewise, and now we are getting to look upon the most formidable club-foot as belonging to the class of cases mentioned, to say nothing of what is known as untreated cases of club-foot.

None of us, I think, claim to cure club-foot in a short space of time. We all recognize time as an important element in the cure of any case of congenital club-foot. The plan that seems most in vogue at the present day, I think is this, not only among orthopedic surgeons, but general surgeons the world over: to overcome first the varus either by means of apparatus, which exercise gradual force, or force under ether at one sitting, and then to overcome the equinus by tenotomy or by manual or mechanical force combined with tenotomy,—in other words, our aim is first to make the case one of equino valgus. I think we all aim to do that.

After we have brought about a typical case of equino valgus,

our aim is then to put the foot into a position of calcaneo-valgus. The difficulties we formerly labored under, in producing calcaneus at a single sitting are not with us at present. I think there is not a single member of this association so far as I know, that is afraid to divide the tendo achilles in a case of congenital club-foot, and get the greatest possible amount of extension or separation of the ends of the tendon.

I am now confining my remarks to a congenital club-foot. In the form known as spastic or hemiplegic club-foot, some of skill hesitate to make of a case of equinus a case of calcaneus.

To return to the subject under consideration, namely, the report and description of this wrench for correcting equinus as well as varus, I may say that its principle is practically that of Dr. Bradford's instrument. The object of his apparatus is to grasp the foot in a position that you would naturally take hold with your hands, getting your fingers over the salient points, then twist the foot into shape. I have used the tarsoclast considerably yet I confess when I saw the apparatus which I now present to you, a year or so ago, it occurred to me that this was of a much more simple form, one that anyone can use more readily. I find considerable difficulty in using Dr. Bradford's instrument, in having students take hold of it, and put it in shape; they do not exactly know where to get the points of pressure; the screws and small pads slip and some of my New York friends have made that objection to it.

The principle of this instrument is so simple that any one can wrench a club foot into very good shape. I think, however, that the best plan is before attempting to correct completely, if you have an extreme case of congenital club-foot, to first, by manual force, convert an equino varus into a case of equino valgus, and leave the foot into position long enough for the bones in the outer side of the foot to become atrophied, and long enough to hope for some hypertrophy of the inner side of the foot where pressure is removed.

Then after this has been in position long enough, the benefit can be tested in this way: My plan is to leave off plaster dressings for one or two weeks, during which time there is no dressing on the foot. Take the foot and place it on a piece

of paper, and make a tracing of the greatest amount of eversion.

If, at the end of a week or two, there has been no disposition to return, I begin then the second part of the treatment, viz.: divide the tendo achilles, and bring both flexion and eversion of the foot by means of the wrench into a case of equino valgus.

I have used it since last September or October in 20 cases, supplementing it in some instances by manual force.

The following brief abstracts will suffice :

CASE 1. Male, æt. 4, d.eq. var. high degree, never treated. Under ether April 8, 1888, overcame by manual force the varus and applied plaster of Paris. The dressings were renewed about once a month until Aug. 11, when the case presented a typical eq. valgus. Tenotomy of tendo achilles then without ether and equinus overcome at once. Dressings renewed once or twice and on each occasion attempt was made by manual force to over correct the deformity. On Sept. 8, it was found that the cure was not complete, and under ether the Thomas wrench was employed, completely reducing all deformity. Discharged Sept. 14, cured—but provided with apparatus which is to be worn at least one year.

CASE 2.—Male, æt. 14, d. tal. eq. var., from infantile paralysis, deformity very pronounced and mid. tarsal region unyielding to manual force. Under ether May 22, 1888, achilles tendon and tense bands of plantar fascia divided subcutaneously. Then with the Thomas wrench, the arch of foot broken down, and a good position obtained; plaster of Paris dressing. June 20, above procedures repeated with the exception of the tenotomies. Position nearly perfect, same dressing as before. Aug. 29, operation of left foot as right is correct. Sept. 15, discharged cured, wearing ordinary shoes with soles built higher on outer side.¹

CASE 3.—Female, æt. 16, with both feet in moderate eq. varus, of paralytic origin. Patient very stout and hence slight amount of deformity made walking quite difficult. Had had several achillotomies and had worn braces for many years. May 25, 1888, under ether, achilles tendons and plantar fascia divided, but deformity could not be overcome until the wrench was employed. With this instrument, deformity over-corrected and plaster of Paris employed. June 21, dressing removed and feet in excellent position. A pair of common shoes

¹Nov. 10, Recently seen and foot still in excellent position.

with outer side raised a little. At present writing, patient walks easily and expresses herself as fully relieved.

CASE 4.—Female, æt. 9, tal. eq. var. paral., never any treatment until July 27, 1888, when under ether the tend. achilles, was divided, and the deformity was corrected by the Thomas wrench. August 10, cure seems complete, yet precaution is taken to build the shoe up and to wear a brace at night.

CASE 5.—Male, æt. 11, double tal. eq. var. congenital. of high degree, apparently much bony enlargement of bones, front and outer side of foot. June 6, under ether, the wrench was employed after division of tend. achilles and the deformity was only partially corrected. June 20, operation repeated; June 30, a slough was found on outer side of each foot. Plaster was not continued until wound should heal. Sept. 15, wounds have healed, but there is no farther attempt at correcting by means of wrench as the case seems better suited for cuneiform osteotomy. This case is practically a failure.

CASE 6.—Male, æt. 11, with d. tal. eq. var. congenital, relapsed. Cured once or twice and discharged from hospital, but on date of re-admission, March, 1888, the varus was pretty well marked in both feet. Treatment as in above cases was resorted to and good position obtained. April 4, operation repeated. Aug. 17, patient discharged with relief of about 75 per cent. with shoe built up on outer side, the case is to be kept under observation.

CASE 7.—Male, æt. 9, d. tal. eq. var. cong., relapsing, treated for many years at hospital both in- and out-door departments. Feb. 17, subjected to treatment as above and on April 4, operated upon the second and May 16, the third time. August 14, discharged, walking with feet squarely on floor and without apparatus. Some precautions as in above cases taken to avoid relapse.

CASE 8.—Male, æt. 4, d. tal. eq. var. cong., deformity quite marked, achilles tendons had been divided five times and deformity had relapsed after each. Jan. 7, treated as above, a fair position being obtained. April 3, operation repeated on both feet. Tenotomy not employed in either instance. June 11, common pair shoes built up as usual. Aug. 7, discharged with ability to flex foot to 90° , and evert to normal limit. Provided with pair of braces to be worn at night and to be kept under observation at out-door department.

CASE 9.—Female, æt. 11, d. tal. eq. var. cong., relapsing, patient under treatment in out-door department from infancy, with pretty faithful attendance. Deformity not marked, yet foot by no means straight. Jan. 27–8, operation. Treatment as above. Feb. 21, operation re

peated and on July 14, discharged practically cured. The functions of the foot very good. Walks well without apparatus. Usual precautionary measures adopted.

CASE 10.—Male, æt. 8, d. tal. eq. var. cong., deformity very marked yet not extreme. April 4, 1888, operation as above. Two weeks later pneumonia developed and patient removed from hospital. Seen during the summer, deformity not having relapsed. To be operated upon in the fall if necessary.

CASE 11.—Male, æt. 5, d. tal. eq. var. cong., deformity more marked on left side. Has had several tenotomies. Jan. 13, operation as above and fairly good position obtained. March 18, operation repeated and excellent position obtained. May 26, Treatment discontinued. Sept. 14, Patient discharged with usual precautions.

CASE 12.—Male, æt. 7, d. tal. eq. var. paral., not very pronounced. July 2, 1888, operation as above, except that tenotomy was omitted. Sept. 11, wrench employed again with excellent results. Final result not obtained.

The above list comprises the majority of the cases operated upon and I regret that I am unable to report final results.

The patients have suffered very little pain after the operation, with one exception and this is the case when failure is reported.

In no instance have I employed the wrench without the administration of ether.

In concluding this report I wish to thank my house surgeon Dr. S. E. Millihan for assistance.

SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR.

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THE meagre description given by surgical authors of this injury, and the importance of its thorough comprehension, in order that the treatment may be efficient, must be my excuse for reporting the following cases.

I cannot think that the accident is so rare as standard surgical works would lead one to believe; for instance, in the system of surgery by Messrs. Holmes and Hulke, reference is only given to two cases, one by Mr. Holmes and another by Mr. Pusey; but in the latter instance the epiphysis was displaced laterally and not, as is usually the case, anteriorly.

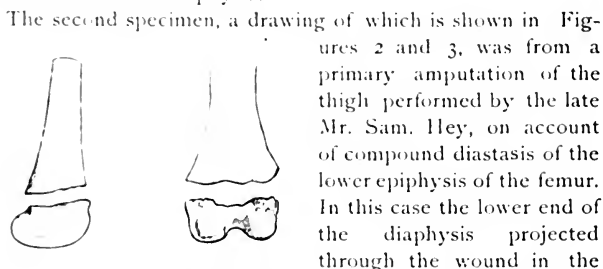
In Dr. Hamilton's treatise on fractures and dislocations, five cases are quoted, in four of which amputation had to be performed, whilst the fifth is said to have taken place during the delivery of a child which was still born.

In the museum attached to the Medical Department of the Yorkshire College are two interesting specimens; in the first, which is represented in Fig. 1, amputation of the thigh had been performed by Mr. Wheelhouse for gangrene, on the forty-third day after injury, which



FIG. 1. MR. WHEELHOUSE'S CASE OF SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR.

had displaced the lower epiphysis of the femur. The diagram illustrates well how the lower end of the upper fragment presses on the vessels, obstructing the circulation; and on the nerve, producing great pain along its course and numbness of the lower part of the limb. The detached epiphysis is seen lying with its fractured surface on the front of the femur, its articular surface being directed forward. The gastrocnemius is attached to the diaphysis.



FIGS. 2 AND 3. MR. HEY'S CASE OF COMPOUND DIASTASIS OF THE LOWER EPIPHYSIS OF THE FEMUR.

The second specimen, a drawing of which is shown in Figures 2 and 3, was from a primary amputation of the thigh performed by the late Mr. Sam. Hey, on account of compound diastasis of the lower epiphysis of the femur. In this case the lower end of the diaphysis projected through the wound in the popliteal space, whilst the epiphysis was displaced forward.

The following case came under my own care at the Infirmary. Fred Vasey, laborer, æt. 16, was admitted to the Infirmary on Dec. 29, 1885, on account of injuries which had been produced by an unshod horse, which had kicked him above the outer side of the left knee joint two days previously.

After being struck, he fell down and was unable to rise again; he was carried home, and soon afterwards was seen by a surgeon, who applied evaporating lotions and sand bags.

When admitted to the infirmary there was considerable swelling with fluctuation around the knee. The leg and foot were enormously swollen, due to œdema and venous congestion, the foot was everted and the leg rotated outwards.

No pulsation could be felt in either the anterior or posterior tibial arteries, the circulation being arrested by the sharp edge of the bone (the lower end of the diaphysis of the femur), which was pressing on the popliteal vessels, and making the skin bulge in the popliteal space. The leg and foot were quite numb but the patient suffered intense pain when movement was attempted. The injured joint was in a state of

semi-flexion, and extension could only be effected at the expense of great pain.

A marked depression was felt immediately above the patella, beneath which could be felt a movable mass with rounded edges. The heads of the tibia and fibula appeared to be normal.

The limb was shortened to the extent of about one inch and a quarter. A diagnosis of separation of the lower epiphysis of the femur was made.

The patient was placed under ether, when the limb was fully flexed on the thigh by an assistant, another assistant placed his locked hands round the femur, drawing it forward.

The epiphysis was then forced into position and the leg extended. This at first failed to effect reduction, but a second attempt completely succeeded; the length being fully restored and the parts bearing a proper relation to one another. A McIntyre's splint was adjusted and evaporating lotions applied. Pulsation at once returned in the tibial vessels, the engorged veins emptied themselves, and normal sensation was restored to the limb within a few hours. The swelling of the leg gradually subsided.

On Jan. 7, a double-inclined plane was substituted for the McIntyre's splint.

On Jan. 27, the effusion into the knee joint had almost disappeared, and a Liston's long splint was applied, there being no tendency to displacement.

On Feb. 10, the splint was removed, there being firm union.

On Feb. 27, he could raise the limb without pain. A Thomas's knee splint was applied, and he was made an out patient.

A month afterward the splint was discarded, and he was allowed to use the limb. There being some stiffness of the knee-joint he was recommended to have it rubbed with oil night and morning, and was encouraged to flex it more and more every day.

When seen two months afterward the joint was capable of being fully flexed, there was no deformity, and the left leg was as useful as the right.

Besides the above, I have seen within the last few years two other cases under the care of my colleagues. In one, the excessive swelling present at the time of the injury prevented a diagnosis being made until a fortnight after the injury, when reduction under ether was attempted, but failed, and excision of the joint had to be performed, as it was necessary that some-

thing should be done to remove the pressure from the popliteal vessels. In another, diagnosed early, reduction was easily effected, and the ultimate result was very good. In all the recorded cases, direct violence has been the cause of this displacement; for instance, in M. Coural's case, a boy whilst running slipped with his leg in a hole up to his knee and fell violently forward; in the example given by Dr. Little a boy hanging on the back of a wagon had his leg caught in the spokes of the wheel whilst in rapid motion; in Dr. Black's case a like accident happened; in Mr. Hey's, the child was run over by a cab; in Mr. Wheelhouse's, a fall of earth was the cause; in the case I have here reported, the kick of a horse produced the displacement.

The diagnosis of such extensive injury might be thought to be devoid of any difficulty; yet, in one case mentioned, the extensive swelling rendered the nature of the injury doubtful for a time. In most cases there can be little difficulty; since the shortening of from one to two inches, the projection of the lower end of the diaphysis in the popliteal space, the displacement of the epiphysis on the front of the femur, and the interference with the circulation of the leg, when taken together with the cause of the injury and the age of the patient, form a group of symptoms pathognomonic of this form of fracture.

The prognosis would seem to be extremely serious, unless the injury be diagnosed and treated at once, if we may judge from the reported cases, in nearly all of which amputation had to be performed.

The dangers, besides the usual ones consequent on so severe an injury, arise from the pressure of the lower end of the diaphysis on the popliteal vessels interfering seriously with the circulation of the leg, and either producing great œdema, or gangrene; or leading to secondary hemorrhage, as in Dr. Little's case.

In a recently published work on "Fractures and Dislocations" I noticed the following paragraph referring to this displacement.

"The symptoms are much the same as those of transverse fracture of the lower end of the femur, and the possibility of this

lesion having taken place, must be borne in mind in dealing with injuries of this part in young persons."

This, to my mind, conveys quite a wrong impression, for in fracture of the lower end of the femur the upper end of the lower fragment is drawn backward into the popliteal space by the gastrocnemius; whereas in diastasis, the lower end of the upper fragment projects into the popliteal space.

In the same work I should also differ from the following remark on treatment:

"The treatment consists of putting up the leg in a double inclined plane in order to relax the muscles which act upon the fragments, and treating the case as an ordinary fracture."

If this advice was followed out, it might do very well for fracture of the lower end of the femur, but in diastasis neither would the deformity be removed nor the danger of gangrene averted.

As regards treatment, *reduction under ether* would seem to be the wisest plan to adopt, and this if difficult would be facilitated by the division of the tendo Achillis. After reduction, either the long splint with weight and pulley, or the double inclined plane, may be employed to return the part in position.

Should reduction be impossible, or retention of the fragments in apposition unattainable, then excision may be adopted; but if the large vessels be ruptured, or gangrene occur, amputation can then be the only resource.

A CASE OF EXOSTOSIS BURSATA¹

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I BEG to submit the following report of a case of exostosis bursata, a pathological condition which has not yet, as far as I am aware, been described in English or American literature.

A. B., a strongly built, well-nourished, healthy young man, æt. 20, came under my notice in the General Hospital in March last (1888). He complained of a tumor on the inner side of the lower end of the right femur. It had been first noticed nine years prior to admission, when, he states, it was as large as a marble, soft and movable. It had grown steadily ever since, and only became fixed and firm four years ago, but had never been painful or tender. It gave rise to no inconvenience until within the last few months during which he had felt a sense of inconvenience and fatigue in the muscles in going up or down stairs, or on over exertion. On examination it was found to be situated over the epiphyseal line at the lower end of the femur on its inner border, was as large as a baseball, apparently pedunculated and with very indistinct outlines. On April 4, I proceeded to remove it, and, in cutting down upon it, I found it enclosed in a synovial-like sac which contained about an ounce of amber colored, slightly viscid but clear, fluid exactly similar to the synovial fluid of the knee joint. In this fluid floated 55 small cartilaginous bodies varying in size from that of a pea to a large bean, and exactly corresponding to the floating cartilages occasionally found in joints, especially in the knee and elbow. When exposed, the bony growth which was about the size of a Fameuse apple was found to be attached to the linea aspera below the

¹Read before Surgical Section of the Canadian Medical Association September, 1888.

epiphyseal line by a bony pedicle about three-quarters of an inch long, and half an inch in diameter. It was directed upward and inward at an angle of about 45° with the long axis of the femur. The surface of the tumor was irregular, and was covered with small, isolated pieces of cartilage arranged in the form of a rough mosaic so as to form a continuous layer over its whole circumference down to the attachment of the pedicle. The sac which became continuous with the periosteum at its attachment to the linea aspera was lined with a membrane, which, on subsequent examination, was found to be identical with the synovial membrane of the knee joint. The fluid contents of the sac were lost so that no analysis could be made, but the cartilaginous bodies were found to consist of hyaline cartilage. The tumor was removed by sawing through the pedicle with a chain saw, dissecting away the sac and chipping off the femoral attachment of the pedicle with a chisel. The patient made a rapid and uninterrupted recovery. This form of growth must not be confounded with the ordinary exostoses which are not infrequently found growing from the epiphyseal lines of the long bones, and is distinguished from the latter by its cartilaginous surface, synovial sac and fluid, and the presence of free cartilaginous bodies.

Only two cases of extra-articular exostosis bursata have been recorded up to the present time, and both by German surgeons. The first case was reported by Billroth in 1863. The synovial sac in this case contained 35 free cartilaginous bodies. It was carefully studied by Rindfleisch, who came to the conclusion that it had originated as an ecchondrosis of the cartilage of the joint which had pushed out a portion of the synovial membrane which, in time, had become cut off from the joint and formed a separate sac for the tumor. The second case occurred in Bergmann's Klinik in 1884. In this case the synovial sac contained about 500 loose cartilaginous bodies (486 were collected). This case and the preceding one (Billroth's) formed the subject of a paper entitled "Zur Casustic der Exostosis Bursata," read by Dr. Fehleisen before the 14th Congress of the Deutschen Gesellschaft für Chirurgie in Berlin in 1885. Two cases of intra-articular exostosis cartilaginea have also been described, the first by Volkmann, and the second by Erhardt. These tumors seem to have been identical in other respects with the extra-articular cases of Billroth

and Bergmann, and with the case which I have just described, but, as I have not had access to the detailed report of those cases, I cannot speak positively regarding them. Fehleisen explains the origin of these growths according to Cohnheim's theory of embryonal error, whereby a group of cells at a very early period of fetal life becomes separated from the border of the joint elements, and existing during the formation of the skeleton as an indifferent cell mass; only later becomes differentiated from the epiphysal cartilage, and finally develops into a misplaced growth of bone, cartilage and synovial membrane. Fehleisen, in examining Bergmann's case, discovered in the tufts of the synovial membrane hyaline cartilage cells. Volkmann states that he has observed free cartilaginous bodies similar to those found in connection with exostosis bursata in a pseudo-arthritis of the femur, and claims from this observation, as well as from the frequently observed existence of free seed-like bodies in ganglia of the extensor tendons, that the synovial membrane is not an essential element in their production. He claims that exostosis cartilaginea always originates from the epiphysal cartilage, or the joint cartilage, according as it is extra or intra articular, and that for an explanation of this condition, it is not necessary to resort to Cohnheim's theory. It is also suggested that traumatism by disarranging the columns of cells in the outer layers of the epiphysal cartilage may be the cause of such columns developing in an abnormal direction. Whatever the explanation may be, it is quite clear that in the extra-articular cases described by Billroth and Fehleisen, as well as in the case which forms the subject of this paper, the growth was quite distinct, both from the joint and from the epiphysal cartilage.

This subject, however, has a most important bearing upon the explanation of the existence of floating cartilages, as they are called, which are so often found in the knee joint, and less frequently in the elbow joint. It appears to me that the most natural explanation of the existence of these bodies in joints is that offered by Fehleisen whereby the cartilage cells existing in the tufts of the synovial membrane develop into small cartilaginous bodies which are set free, and float loosely in the synovial fluid. The many explanations hitherto offered

for the existence of those bodies, such as inflammatory processes, quiet necrosis of cartilage, etc., have entirely failed to offer a satisfactory solution of the question of their origin.

TUBERCULOSIS OF THE SACRO-ILIAC JOINT.— (CONCLUDED).

By WELLER VAN HOOK, M.D.,

OF CHICAGO.

WE must now leave the discussion of the "dry granulating" form of the disease and consider the "moist" or "cold abscess" form. The former exhibits a tendency, as has been seen, toward local limitation; the latter is locally aggressive, tending to infect by successive ruptures of its abscess walls as well as by inherent microbic energy, tissues previously healthy. The first form is under favorable circumstances inclined to recover; the second is equally inclined to terminate fatally. We may therefore expect the treatment to be entirely different.

It is unnecessary here to discuss the constitutional remedies to be adopted in abscess cases, since the question is one rather of medical than surgical therapeutics. For no general treatment has been found that can operate upon local tuberculosis except in an indirect way. But, far from neglecting this branch of treatment, the surgeon will carefully study the constitutional condition of the patient and endeavor to improve it as far as possible.

The local treatment of sacro-iliac tuberculosis with abscess formation now admits, as I believe, of definite formulation, within certain limits. We have seen how successful has been the treatment by rest, systematically applied, in cases which did not present cold abscesses. We then concluded that, if our statistics representing 94.1 per cent. of recoveries were borne out by future records, there would be no reason for undertaking a different plan of treatment. But when abscesses have formed the death rate springs from 5.9 per cent. to 92.1 per

cent. under non-operative treatment. The cause of the large proportion of fatal results is to be sought in secondary infection of distant parts with tubercle bacilli, and in intercurrent diseases, but chiefly in the mixed infection of the tubercular abscesses resulting in sapræmia and often eventually in septicæmia, terminating in death.

The treatment heretofore most widely pursued by the profession has been simply palliative, and it is this policy of "let alone" that has been chiefly responsible for the complications that ushered in the fatal issue. The palliative treatment of the disease is moreover to be arraigned not only for its high death rate, but for the hopeless suffering of the patient as he nears the grave. Permit me to cite an example—by no means extraordinary—from the monograph of Delens, who in turn refers to Larrey. (See case 9, table 1).

"Chalopin, a private in the 47th regiment of the line, entered the service of Baron Larrey at the Military hospital of Val de Grace, March 19, 1851. He was a man of bad constitution, had chronic bronchitis and appeared to be in a state of tubercular cachexia.

"Two years before, he fell in going down a stone staircase and struck upon his right hip. Some pain was noticed on the following days, but he remained on duty. The pain disappeared on resting, but returned at certain periods, chiefly at times when the weather was cold and wet.

"He was several times in the hospital at Nantes when counter-irritation was practiced in the trochanteric region. Acupuncture did no good. At that time there was no swelling or deformity, though the patient could hardly walk.

"On entering Val de Grace they observed the existence of pains over the right sacro-iliac symphysis, the impossibility of standing or walking and a manifest swelling near the trochanter.

"Thirteen days later a cold abscess was opened over the sternum.

"April 4 and the days following moxas were applied at the side of the sacro-iliac joint.

"May 10. The swelling already mentioned in the trochanteric region had become larger and was associated with redness of the skin, tension and an intense febrile reaction.

"May 30. Greater prominence of the tumefaction was noted with

fluctuation and sharp pain over the joint. On the next day the abscess was opened, giving exit to 500 grams of lumpy curdy pus.

"June 2. Reaction has been sharp, the pulse full and frequent, the face suffused, the pus less abundant, and the patient had a sensation of malaise with occasional chilliness.

"June 6. A probe passed easily into the pelvis along the anterior face of the sacrum. The patient lay on the left side. He was relieved by sustaining the pelvis from the right side with several cushions. High fever was presenting, but there was no resorption of pus.

"June 7. A counter-opening made below the first evacuated much grayish lumpy pus and a seton was passed between the two openings. The patient grew worse, suffering from a high fever.

"July 10. An abscess opened at the level of the right sacro-iliac joint when it was noted that there was denudation of the posterior face of the sacrum and ilium, and an abnormal mobility with crepitation between the articular surfaces of these two bones. The signs of purulent infection persisted, and July 29, a little more than four months after admission, the patient died."

Numerous other examples might be adduced to demonstrate the horrors of such a mode of death. But the great mortality of this disease under such therapeutic measures would be alone sufficient to condemn that treatment if another and more promising method were available.

It must, however, be remembered that at least one case has recovered under rest alone, the case of Mr. Hilton, in which a cold abscess healed after spontaneous absorption of its contents; while two cases of Tiling recovered after drainage by no means systematic. These cases are, however, in very small minority, and enable us to draw no conclusions for future work.

In the present state of surgical science palliative treatment by simple drainage must be reserved for cases in which the radical operation is especially contra-indicated, as in cases complicated by mortal disease elsewhere. This conclusion is strongly supported by the statistics of radical operative interference. Thus far two cases have been operated upon by Dr. Sayre with recovery, and two cases each by Tiling and Gant. Tiling's cases died; Gant's recovered. (It is probable that one

of Tiling's cases, however, was not tubercular). The case reported in this article by the writer also recovered. Thus out of seven cases five recovered, a percentage of 71.4. Besides this rather small list of fully recorded cases of operation, Mr. Barwell¹ briefly mentions a case of his in which recovery ensued after operation.

We have seen, in examining the history of the treatment, how averse to operation have been the surgeons of the past. As we have observed Prof. Sâyre has been an exception to this rule during the many years of his practice. But many of the older surgeons were dismayed by dangers that do not affect those practising under antiseptic precautions. Hence, for us, only the opinions of recent writers are valuable. Mr. Barwell has, in his article in the *International Encyclopædia of Surgery*, discussed the propriety of operation. He counsels a sufficiently early drainage of abscesses, and, in case the disease has not extended too far, removal of the morbid material. But, if there is implication of the front of the sacrum, the treatment will depend upon the condition of the patient. In much debilitated patients no operation should be performed; but if the patient is more robust he strongly advises "perforation along the sinus track and drainage."

Mr. Heath,² writing in 1876, considers operative interference a very serious matter.

The experience of Gant, with his two successful operations, is certainly on the side of surgical interference.

G. Tiling³ states that treatment will depend partly on what part of the bone is affected. He continues:

"Since we cannot in the near future hope to be able to accurately locate diagnostically the primary foci of tubercular disease in these bones so as to remove them, our treatment must be in the beginning a more expectant one. In perforation into the rectum and bladder, the therapy is quite defective; in those opening at the anus they must be limited to the necessary disinfection. If the pus break through along the

¹See article on "Joint Diseases," *International Encyclopædia of Surgery*.

²*British Medical Journal*, 1876 Vol. II, p. 781.

³*St. Petersburger Medicinische Wochenschrift*, July 3, 1883.

path of the iliacus or above Poupart's ligament, one might still think of rational radical treatment since one may try to reach the diseased bone with the sharp spoon. But the result will be for the most part *nil*. The spoon cannot act well at such a distance through a small opening.

"The best field for operation is when pus breaks out directly. [That is when extra-pelvic abscesses point just posterior to the joint.] Here both hand and eye can act together. The prospect is then not brilliant, the often extensive cavities in the soft parts and bones being very unfavorable. A *prima intentio* is inconceivable; the neighborhood of rectum, anus and urethra places a heavy test upon the carrying out of antisepsis for weeks and months. Hence resection cannot be undertaken for insignificant cases."

One objection here raised to operative interference is on account of the uncertainty of operations conducted along the tracks of old sinuses. I believe the objection is well taken. As will be seen later the indication of intra-pelvic abscess is met by a procedure, suggested by the writer which will obviate the difficulties encountered in operating through sinuses.

That resection (that is, atypical resection) cannot be undertaken for insignificant cases is self-evident. But the writer believes he has demonstrated that cases which cease to belong to the class of non-abscess cases are no longer insignificant but are exceedingly grave and therefore demand operation.

The anatomical objections to operative interference are less formidable than might at first appear. The sacrum and ilium are in no way immediately associated with the vital functions and large parts of them may be removed by the chisel with impunity. The fact that the pelvic girdle may require lessening in extent is chiefly important in child-bearing women. But the dangers encountered in the course of the disease would amply justify operation, even with the risk of subsequent dystocia. The pelvis usually regains its integrity by bony ankylosis. The neighboring soft parts are in no danger of injury from the operation if ordinary care is taken in its performance. The danger of bringing about mixed infection by operating is, as Tiling has pointed out, very great indeed. But mixed infection of cold abscesses has eventually occurred in

every case with which I am acquainted except that one of Mr. Hilton's which resulted in recovery after absorption of the fluid. Hence we must argue that the very free drainage used by the surgeon gives the patient a much better opportunity to resist secondary microbic invasion than when infection has occurred in the closed cavity. Moreover, the strict application of antiseptic principles will insure in a portion of the cases where operation is undertaken in abscess-cases hitherto entirely tubercular, at least a certain period of asepsis till the granulations have sprung up in sufficient array to render septic absorption in the presence of good drainage a matter of comparatively slight danger.

I believe then that operative interference should be resorted to in every case of sacro-iliac tuberculosis that exhibits unmistakable signs of abscess formation. If, then, operation is thus decided to be imperative it needs but little argument to prove that it should be resorted to in every case as early as practicable after the determining indication, the formation of the abscess, has presented itself. For if the operation is not immediately performed opportunity is afforded for the further extension of the disease by infection from immediate continuity of tissue and by rupture of the cold abscess wall, allowing infection to take place in hitherto healthy tissue. Moreover, should mixed infection occur, symptoms of septic intoxication are added and suppurative osteomyelitis renders the case very grave. Such a misfortune also renders operative interference less hopeful on account of the weakened condition of the patient.

Abscess formation having occurred and radical operation having been decided upon I conceive that the mode of operation will depend entirely upon the seat of the original focus and the direction which the disease process has pursued. Tiling has well averred that we cannot accurately locate in every case the original focus of the disease. One symptom, however, will determine its position with sufficient accuracy for clinical purposes, namely, the position of the abscess. Under the head of Pathological Anatomy we discussed the direction taken by abscesses arising in the sacro-iliac joint. It was seen that, owing to the anatomy of the part, the abscesses occurring in

connection with that joint must pass either anteriorly or posteriorly, that is, they must arise either within the pelvis or without the pelvis, so that all of these abscesses are either intra-pelvic or extra-pelvic. Clinically, as we have seen, it is occasionally somewhat difficult to determine the class to which a given abscess belongs. But it is probable that close attention to the details cited above will determine the point. Now, in accordance with the law that local diseases, like other natural forces, tend to advance in the line of least resistance, we argue that, if an extra-pelvic abscess is present, the morbid material, having escaped from the posterior part of the joint, the principal focus of disease must have been near enough to the great posterior ligaments to weaken them and thus allow the passage of the tubercular detritus in that direction. The same argument applies with reference to the anterior part of the joint when the abscess is intra-pelvic. Nor is the reasoning vitiated whether the disease originated in the bone or within the joint cavity itself, since in either instance the important joint structures are sooner or later involved. Hence when the abscess is intra-pelvic we conclude, at least hypothetically, that the disease is most advanced at the anterior part of the joint; and when the abscess is extra-pelvic, that the morbid process is most advanced at the posterior part.

We are then confronted with the problem of reaching the diseased material in these situations with the maximum economy of healthy tissue and with the greatest assurance of being able to remove the morbid matter when it is reached.

Tiling has well said, as we have seen, that the most favorable cases for operation are those in which the posterior part of the joint is affected. When the presence of an extra-pelvic abscess indicates this more fortunate location of the disease-focus, the operation demanded is simple in nature.

If the abscess is not already opened this should now be done (under strict antiseptic precautions) and, its walls having been scraped to remove tubercular matter, the opening leading to the joint cavity should be found and sufficiently enlarged to admit of ready access for the finger and for such instruments as may be needed. If, as may occur, the disease is neither extensive nor very deeply seated it may be unnecessary to re-

move any healthy bone, so that a free use of the bone gouge and curette suffice. If bone tissue has to be removed to afford greater space for work it is best taken from the ilium, since access to the joint cavity is thus much more easily attained than when a part of the sacrum is chiseled away. Further than this, general rules cannot be laid down since almost every case presents special anatomical peculiarities. One rule should be regarded as imperative—to remove, if possible, all of the tubercular matter. Drainage should be effected by means of iodoform gauze. The following case of Prof. Sayre will illustrate the method perfectly:

No. 46. J. T. L., æt. twenty-three, Westfield, Massachusetts. Came to me Feb. 14th, 1863 with sacro-iliac disease on the right side, with extensive abscess on the posterior crest of the ilium. Right limb half an inch longer than the left, from actual dropping of the ilium. Had the peculiar curvature of the spine of sacro-iliac trouble. Had fallen from a horse four years before and had been troubled ever since, having been treated the two years previous for hip-disease, then sent to me for that trouble. I found no disease of hip joint; but opening the abscess on the sacro-iliac junction gave free exit to a large amount of pus and revealed caries of ilium and sacrum. The dead bone was all gouged away; the wound was dressed with Peruvian balsam and oakum and an extension applied in bed. Afterwards a high-heel was used on well side and crutches were supplied during the day. Recovery was perfect in about fourteen months."

The two cases of F. J. Gant (see table) were examples of cases exhibiting extra-pelvic abscesses. Operation was equally successful. But it must not be supposed that so favorable a termination is always to be expected, since often there is not only an extra-pelvic but also an intra-pelvic abscess, so that the disease is very extensive and requires a correspondingly extensive operation. It is probable that rectal palpation would have enabled the operator in the following case to recognize the intra-pelvic abscess; but the treatment would not have been much affected by such additional knowledge. The case is the fourth of Tiling's.¹

CASE 18.—Boy, æt. 14, previously healthy, entered his care on Jan. 8. Four months before, small swelling was noticed on left buttock. It has increased rapidly since Christmas and now is a colossal

¹St. Petersburger Medicinische Wochenschrift, July 23, 1883.

abscess under the gluteal muscles. The hip is freely movable. Jan. 9, free incision. Enormous quantity of pus came from below the gluteal muscles and out of the foramen ischiadicum majus. The tuberosity of the ilium, the upper border of the foramen ischiadicum majus and the border of the os sacrum were carious. The tuberosity of the ilium was almost entirely chiseled away, so that the facies auricularis ossis sacri lay completely exposed to the eye. Besides the posterior half of the upper border of the great sciatic notch was removed and, since the finger could not yet press freely into the pelvis, the edge of the os sacrum was removed.

"It was now observed that in the hollow of the sacrum was a mighty pus cavity extending to the right s.i.j., the bones in that direction being covered with periosteum. In the cavity of the sacrum the bone was widely laid bare. The whole os ilium sinistrum was now quite movable about an axis passing through both its symphyses but above and internally was retained in the position by the ligamenta ilio-lumbalia and ilio-sacralia anteriora, since a small part of the anterior and upper border of the facies auricularis ossis ilii was left behind. The bone was removed to this extent because it was so far diseased throughout. Several heavy drains were passed into the pelvis, the wound irrigated and dressed." Pus had no bad odor. Temperature at first fell but frequently rose and under profuse suppuration the patient's strength failed; the pus cavity diminished much in size, but even after six weeks retained considerable size and discharged healthy pus. An ominous diarrhœa now set in which led to death eight weeks after the operation.

"Autopsy, acute tuberculosis of both lungs—superficial caries of the anterior surface of the sacrum, of the fifth and fourth lumbar vertebræ and of the left lateral surface of the sacrum. Right sacro-iliac joint sound. Left half of pelvis of course much smaller than the right since the shortened os ilium sin. was sunken upon the sacrum."

The second case operated upon by Tiling was subjected to a procedure very similar to that undertaken in the case just quoted, was equally severe in character and was equally unfortunate in result. The clinical history of the case, however, is rather that of implication of the joint from osteomyelitis, the disease affecting a number of different joints simultaneously.

But when the anterior part of the joint is chiefly involved, as denoted by the presence of intra-pelvic abscesses alone, and

especially when, from the consensus of symptoms, the surgeon has reason to believe that the anterior face of the sacrum is not diseased to a very great extent, we are compelled to seek operative measures by which, if possible, the disease may be reached without the extensive removal of healthy bone required in the cases operated upon by Tiling.

A systematic procedure has been devised by the writer based upon the following case in which the operative interference was successful.

CASE 50.—Harry D., an unmarried man of 32 years of age, entered Cook County Hospital, Chicago, on Jan. 3, 1887. His family history was good. His own history included gonorrhea, and probably syphilis. He had had occasional hæmoptyses for about fifteen years until one year before admission. In the early weeks of 1886, one year before he entered the hospital, the patient began to suffer from a disease of the spinal cord, diagnosed after he came to the hospital, by Prof. Walter Hay, of Chicago Medical College, as polio-myelitis anterior atrophica. By October of the same year he had already passed through the worst stage of the disease and had, he said, begun to improve, when one morning in bed he was suddenly seized with a pain in the "lumbar region."

A few days afterwards a tumefaction appeared which gradually increased in size, till in November a pint of pus was removed from it by aspiration. When examined, on admission to the hospital a fluctuant swelling was detected in the right iliac fossa, and another and larger one above the posterior part of the crest of the ilium, extending upward to the twelfth rib, and from the spines of the lumbar vertebrae to the right for a distance of about four inches. The patient had not been able to walk since July on account of his nervous affection, and since that disease had impaired sensation also in the lower extremities, the location of the primary focus was by no means readily diagnosed. The patient lay on the left side with the thighs moderately flexed.

January 23, 1887, the writer, then house surgeon to the hospital, operated on the case under the direction of Dr. Christian Fenger. The posterior abscess was first opened and, its walls having been thoroughly scraped, the probe was used to find the primary tubercular focus. The probe readily passed downward and forward to the anterior part of the sacro-iliac joint. It was then evident that the two ab-

scasses had a common origin in that articulation. To reach the disease-focus a part of the posterior superior spine of the ilium was removed by the chisel so that the finger easily passed into the pelvis major and guided the bone instruments to the focus of the disease. The anterior ligaments had been chiefly destroyed by tuberculosis, so that

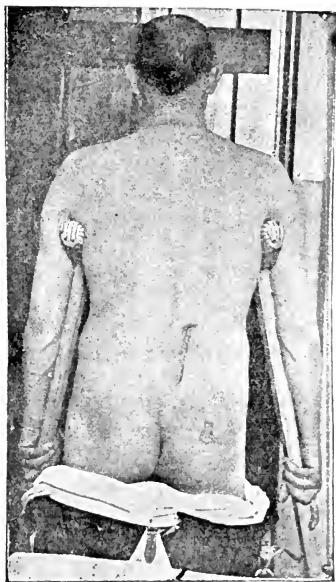


FIG. 2. HARRY D. SHOWING LINE OF INCISION FOR OPENING THE LUMBAR ABSCESS AND OPERATING ON THE SACRO-ILIAC JOINT.

detritus was readily removed and the joint cavity cleared. Iodoform gauze was used as a drain. The abscess in the iliac fossa was now opened and drained with a rubber tube, and a huge antiseptic dressing applied. For the first few days the discharge was very profuse, but after a couple of weeks improvement was very rapid, so that in about

four months from the time of operation the patient was well, so far as his sacro-thiac disease was concerned.¹

This is the only case of recovery, so far as I can ascertain, after operative interference in intra-pelvic abscess case; indeed but one other case of this kind has ever recovered, that of Hilton, already referred to, in which the abscess detritus was spontaneously removed under the influence of complete rest.

The systematic operation may be performed as follows: The patient lying on the unaffected side with the thighs in exaggerated flexion on the pelvis, the site of operation will be brought into the greatest prominence possible. An incision two or three inches in length will expose to view the posterior superior spinous process of the ilium which should be freed from periosteum and tendinous connective tissue by scraping with a dull instrument. A chisel about one inch in breadth is then used to remove successive small fragments from the exposed bone, always holding the chisel edge parallel to the spinous processes, till the finger can enter the cavity of the pelvis major and palpate the anterior surface of the diseased joint. With curved bone instruments the detritus can now be removed and the wound be packed with iodoform gauze. It will thus be seen that, in cases to which the method is adapted, according to the indications laid down, the operation can be performed without doing any damage to vital structures, or even to important parts of the locomotor apparatus.

In cases which, like those operated upon by Tiling, exhibit extensive implication of the tuberosity of the ilium, extensive removal of the osseous structures is much preferable to slow death from tuberculosis or septic infection. But of such cases each must be a law unto itself as regards the portion of bone to be removed. One rule, however, should be observed in all cases—to leave no tubercular matter that it is possible to remove.

The after treatment of operation cases should include, besides the obvious employment of strict antiseptic principles,

¹This patient is now, October, 1888, able to walk a little, having to that extent recovered from his nervous lesion.

the use of the weight and pulley extension, and when the patient can move about, the high-heeled shoe on the sound side with crutches so as to afford rest to the joint. The broad pelvic belt seems to me especially important where the joint has been completely penetrated, or where the tuberosity of the ilium has been removed.

CONCLUSIONS ON TREATMENT.

1. Sacro-iliac disease is not directly amenable to treatment by drugs. They should, nevertheless, be employed by the surgeon in all forms of the disease when they are likely to improve the general condition of the patient.

2. Counter-irritation is indicated when there is pain, lameness or tumefaction at the joint without abscess formation. The actual cautery seems to be the most effective form.

3. Mechanical rest, which is here also physiological rest, is the treatment par excellence where no abscesses are present.

4. When abscesses have formed radical operative interference must be immediately resorted to.

5. If the abscesses are extra-pelvic they should be operated upon by direct incision and *évidement*.

6. When the abscesses are intra-pelvic the operator should approach the disease focus, supposedly in the anterior of the joint, by an opening made above the joint proper as described.

7. When both extra- and intra-pelvic abscesses are present the external abscess should be first opened, and the opening between the two, if possible, so enlarged as to admit of radical treatment of the deeper focus of disease.

8. Radical operations cannot be made through long sinuses.

9. Drainage alone is not likely to be successful.

10. After-treatment should include besides antiseptis, continual rest, aided when necessary by the extension and pelvic belt.

11. When radical operation is undertaken no tubercular matter should be left behind.

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EDITORIAL ARTICLES.

THE PROGNOSIS AND STATISTICS OF OPERATIONS FOR CARCINOMA OF THE RECTUM.

Rectal surgery has been the subject of careful study latterly by many German surgeons. In the ANNALS OF SURGERY for last February reference was made at length to the work in this direction of Bardenheuer, Schuchardt and Esmarch. From the Göttingen clinic two important papers¹ have more recently appeared. In an elaborate memoir, read before the last Congress of German Surgeons, Professor Koenig fully considered the recent advance in our knowledge of the history of carcinoma and the work of the German Society of surgeons in this field, and his paper was thoroughly discussed by his confreres. He noted those points made clearer by recent advances, showing the improved prognosis after operations necessary for the removal of carcinomatous growths. This is true of all operations on the open surface of the body whereas the cavities clothed with mucous membrane have continued an unfavorable field. Here thorough antisepsis is difficult. The prognosis of recovery divides itself first into the limited recovery in which the patient remains free from a return of the disease for 2, 3 or 4 years. This limited recovery is of the highest moment both to the physician and the patient if we consider that most patients are attacked with carcinoma only in the second half of life. While we can give abundant statistics concerning this first class of patients, there is little certainty in the second class of definitely cured cases—in a scientific sense those in which after a prolonged life no return of the disease has

¹Einige Bemerkungen zur Prognose der Carcinom Operation mit besondere berücksichtigung des Carcinoma Recti, von Dr. F. KÖNIG (Cöttingen). *Beilage zum Centralblatt f. Chirurgie*, No. 24, 1888.

Zur Statistik der Rectum Carcinome, von Dr. O. HILDEBRAND (Göttingen). *Zeitschrift f. Chirurgie*, bd. 27, hft. 3 u. 4.

occurred, either in the place of operation, glands or metastases. The schematic time of two or three years is not sufficient to clear this question. If we take the 66 cases of amputation of the breast performed in the Göttingen clinic in which there was a return of the disease (carcinoma) it is found that half of those suffering from carcinoma of the breast show a return of the disease the first six months after operation: One third were attacked in the second six months and at the end of the first year 52 showed a return of the disease. Seven of the remainder were attacked at the end of the third year. Three showed a return at the end of 4, 5 and $10\frac{1}{2}$ years respectively. The author assumes that in these late returns we have a development of germs for a long time inactive in the cicatrix or glands pertaining to the same. It is to be supposed that a continuation of these observations through a long series of years would bring many cases to light similar to those shown in statistics of the author. It can be assumed that 30 per cent of all operated cases remain healthy for 3 years.

In cases of carcinoma of the mucous canals we have few facts established; in carcinoma recti reliable statistics are still wanting. In face of the favorable prognosis of a recent author who places the mortality at 8 per cent the author thinks the mortality after the operation still high. The prognosis as to a return of the disease is still less favorable than in carcinoma of the mamma and the prognosis as to function is bad. Of 77 cases of cancer of the rectum in the Göttingen clinic 17 were rejected as inoperable; 60 were operated upon. In the latter the anus with part of the rectum was removed and in 44 the rectum was resected. The peritoneum was opened in 15 cases but in only one case did peritonitis follow. Great stress was laid on preparatory treatment. (diet of food leaving little residue, cathartics), for from 4-8 days previous to operation. The operation was performed mostly in the lithotomy position with the posterior raphe incision and extirpation of the rectum. The intestinal stump was freed as much as possible with the finger far above the peritoneal reflection,—a procedure easy to carry out on the anterior wall. The number of ligatures varied from 2-10 and the glands posterior to the rectum were removed as much as possible with the surrounding fat tissue. The wound was irrigated after

operation with a solution of salicylic or carbolic acid, powdered with iodoform and after a few sutures packed with iodoform or, after deep suturing of the intestine to the external wound, drained. The latter method has been resumed on account of the bad prognosis in packing. By the above method the mortality was 24 per cent though in the past six years this figure has been reduced one half. Ten per cent were free from a return of disease for over 3 years, 18 per cent for 2 years. Of 21 patients examined in 4 of whom the rectum was extirpated, continence was absent in all and one patient in addition had stenosis. Two of the resected cases have symptoms of stenosis, nine are almost unable to retain feces, and in 6 the continence is bearable under the above circumstances. Colotomy must be strongly recommended to the inoperable cases. The operation (colotomy, is not dangerous. Six deaths out of 21 operated cases of the author were divided as follows: Three from perforating peritonitis due to the carcinoma; one collapse; one from pneumonia, and one from peritonitis following the operation. The patients lived: $4\frac{1}{2}$ years, (1); $2\frac{1}{2}$ years, (1); 2 years, (2); and 1 year, (4), most of the cases with an anus functioning satisfactorily.

Dr. HAHN (Berlin) agreed as to the favorable results of colotomy but sews both the peripheral and central extremities of the colon to the external wound, so that in cases of non malignant stricture this may be treated afterwards with bougies and irrigation. Finally, after cure of the stricture the colotomy wound heals. He divides the spur between the portions of the colon with a modified Dupeytren clamp.

Dr. BARDENHEUER (Cologne) had operated in 13 cases of carcinoma recti by his method. Continence was possible though not in all cases. Two of the cases had died of necrosis of the central portion of the gut.

Dr. KOENIG replied that he had met with necrosis caused by too great traction on the intestine. This could be avoided.

Dr. SCHEDE (Hamburg) operated according to the Kraske method leaving the sphincter and anus intact.

Dr. KUSTER (Berlin) thought an additional colotomy unnecessary. He sews first anteriorly and then circularly with deep silk suture reaching the mucous membrane. A drain wrapped with iodoform gauze is then carried high into rectum and the wound thus protected from intestinal contents.

DR. HEIFERICH (Greifswald) in carcinoma of the mamma, removes the axillary glands and in disease of these also the infra-clavicular glands by division of the pectoralis major, then sews the connective tissue with catgut. He thinks this the preferable method.

DR. GUSSENEAUE (Prag) thought that disease which appears after a long time in a cicatrix or gland is an infection *in locum minoris resistentiæ* (cicatrix). For some time past he has extirpated all glands in carcinoma of mamma and other cases of carcinoma and in rectal cases the whole cellular mass of the bony pelvis with glands. As far as the promontory, the cure of carcinoma by a thorough extirpation as above is well established.

DR. LOEBKER (Greifswald) thought the prognosis of the return of the disease is better in young subjects.

DR. V. BERGMANN (Berlin) cited Bramauns brochure on cancer of the rectum in which 26 recoveries in 27 cases were recorded. He thinks the dangers of extirpation of the rectum much lessened and prefers the operation to colotomy.

The paper of DR. HILDEBRAND presents a statistical review of the results of the clinic in Göttingen with a comparison of the cases published by other operators. The large majority of cases of carcinoma of the rectum (54 per cent) in the Göttingen clinic occurred between the ages of 40 and 60 years. Thirty per cent of these cases occurred between 60 and 80 years. As regards sex, 31.7 per cent were females. Of 69 cases of carcinoma of the rectum upon which this paper is based, only two were confined to the external anal ring. Among the tumors three melanotic carcinomata were found, a rare form of growth. Most of the carcinomata of the rectum were in form of a ring-like stricture, or again the growth took the shape of a cuirass as in the breast. Excluding the inoperable cases, in 54 operated cases the lymphatic glands of the surrounding area were affected in 24 cases. The author allowing for failures in diagnosis and operative removal of glands, would place the percentage of cases in which the glands were affected much higher. For in 13 cases of autopsy where the operator thought the glands had been thoroughly removed, this was proven to the contrary. It will not be exaggeration

to say that the lymphatic glands are affected by the disease in at least 50 per cent of the cases. The glands referred to are the perirectal lymphatics. There are meagre statistics as regards the inguinal glands.

Of these 69 cases which came to the clinic for operation, 15 were regarded as inoperable. In all cases where the carcinoma was confined to the anal ring, extirpation of the tumor with or without the removal of the external sphincter was performed. If the mucous membrane of the rectum was compromised, extirpation of the rectum was resorted to. When the sphincters were not affected, resection of the rectum alone was resorted to. There were two cases of the first, 13 of the second, and 39 of the third class. The operation of Kraske was not performed in any of the cases in the Göttingen clinic.

The rate of mortality immediately following this operation (57 cases) was 35, (20 cases). During the past six years the mortality only reached 14.9 per cent against 30 per cent of the previous six years. The preparation of the patient and the improvements in technique are accountable for this improved rate of mortality. The secretions of the wound are markedly improved in character through the application of the iodoform methods of dressing.

Of 54 patients, three remained free from symptoms for more than 3 years. Six for more than two years and eight over one year, and have up to date no return of disease. Of the whole number of patients, including those still living with a return of disease, at least 31 have lived free from symptoms for a period of three years. There are only three cases of definite cure, up to the date of the statistics (10 per cent) In the majority of cases recurrence of the disease occurs early, during the course of the first half year after operation.

As to the point at which the return of the growth began there are no definite data. In the greatest number of cases there was only partial return of the normal functions of the canal after operation. There was either incontinence or cicatricial stenosis of the anus. Continence without stenosis was uncommon, being present only in isolated cases. In four cases of extirpation recti, incontinence was present in three, one having stenosis. In 17 cases of resection of the rectum with retention of the sphincter there are isolated instances of continence, but these soon acquired incontinence and stenosis.

The author concludes that in carcinoma recti the mortality after operation is high, the percentage of definitely cured cases small, and the restoring of function after operation bad. He pleads for a more careful selection of cases holding out the hope of definite cure. In the inoperable cases the object of the operation is to facilitate fecal evacuation, eliminate pain, retard the advance of the growth and cachexia. The artificial anus with eventual curetting of the growth aids to these ends. In 19 cases artificial anus was made in Koenig's clinic for stenosis. The operation is not dangerous but some cases died after it from perforating peritonitis (3), preumonia (1), unknown causes (2). The functional result of operation was in all satisfactory, and in no case did the patient return to have his artificial anus closed.

HENRY KOPLIK.

INDEX OF SURGICAL PROGRESS.

HEAD AND NECK.

I. The Pathology and Therapy of Pachymeningitis Externa Purulenta after Inflammation of the Middle Ear.

By DR. E. G. HOFFMANN. This is an exhaustive research into the literature, pathology and therapy of this class of cases with histories of three cases of the author's. The paper concludes:

1. That Purulent Pachymeningitis Externa is the most frequent of intracranial diseases complicating inflammation of the middle ear, but escapes diagnosis on account of the indefinite symptoms it causes.

2. It is the most frequent agent in exciting those fatal intracranial diseases (meningitis, sinus phlebitis, and brain abscess). The latter diseases are favored in their development by prolonged pachymeningitis and retention of its purulent exudate.

3. If the bone be diseased in inflammation of the middle ear, the complication of pachymeningitis must be thought of, if after opening of the mastoid process, the threatening symptoms continue or the symptoms of beginning meningitis, or sinus phlebitis appear. The treatment is operative and follows in most cases the opening of the mastoid process, and has for its object the exposure of the inflamed dura mater.—*Zeitch. f. Chir.*, Bd. 28, heft 4 and 5.

HENRY KOFLIK (New York).

II. A New Method of Transplanting Corneal Tissue.

By C. A. VON HIPPEL. The author holds in connection with this operation. 1. That the transplanted flap dies but *very exceptionally*. 2. The nutrition which comes from its periphery is perfectly sufficient to keep it alive. A new-formation of tissue upon its posterior surface forms a disagreeable complication. 3. Even where there is no such formation of tissue, the posterior layers of the flap may get dim. its tissue

may swell, and a smaller or larger portion of its epithelium may be cast off.

It is first necessary to get by oblique illumination as exact an idea as possible, of the extent of the leucoma in depth and of the existence of an anterior chamber. The author then proceeds as follows:

1. Introduction of the speculum: grasping the eyeball on opposite sides with fixation forceps; putting the trephine vertically upon the leucoma, but without pressure, and cutting off the piece which is to be removed. The diameter should not be more than 4 or $4\frac{1}{2}$ mm. This is always followed by hæmorrhage which is stopped by sublimated ice-cold cotton.

2. Removal of the piece of cornea. For this the author used a strong, straight iris-forceps, with sharp teeth, one branch of which is inserted as deeply as possible into the incision in order to grasp, if possible, the whole thickness of the flap, and stretch it. The removal is done with Graefe's knife.

3. Excision of a corresponding piece of the whole thickness of a rabbit's cornea. The eye is cocaineized. By means of a squint-hook introduced behind the eyeball, it is pressed against the lids as far as possible and fixed in that position. Fixation with forceps alone is not sufficient. If the flap is shifted under the trephine it can not be used. It is, of course, necessary to arrange the trephine so, that it will pierce the whole thickness of the cornea, if there is any iris pigment adherent to the posterior portion of the flap, it must be removed by irrigation with a sterilized 0.6% solution of chloride sodium.

4. Transplantation of the flap to the human eye by means of a rubber spatula—no speculum required. When the hæmorrhage ceases, the flap is laid on the cornea by the side of the defect and slowly shifted into it, taking care to avoid air bubbles. Finally, a slight pressure is exerted on the flap by means of a spatula, in order to give it a good apposition all over. If the flap protrudes over the level of the cornea it is easily displaced.

It is best therefore to take young animals with a thin cornea. After the flap has been brought into the proper position, it is thinly dusted over with iodoform and the lids are carefully closed, the upper one be-

ing lifted over the flap. Both eyes are put under a pressure bandage and remain so for several days. After that time this bandage is changed every 24 hours, and on the eighth to tenth day, the eye operated upon is left unprotected.

The following is the process of healing: After 24 hours slight inflammatory changes are seen, the bloodvessels are more injected, the corneal tissue around the flap to the extent of 1 or 2 mm. in width, is dim, slightly swollen and prominent; the flap itself is either perfectly transparent or slightly steamy. The untouched layer of corneal tissue below the flap reflects the light more strongly, and if it contained blood-vessels these are more injected. In the course of the first week this injection of the eyeball disappears, and the space between the flap and cornea, beginning at the periphery, is gradually obliterated. Neither vascularization nor swelling of the flap occurs. Sometimes small infiltrations are observed near its edge, which, however, disappeared rapidly, and without leaving a trace. After the third week the process of healing seems microscopically to be perfect. In four cases out of eight, the operation was successful, and the author concludes:

1. The possibility of the transplantation of corneal tissue with preservation of its transparency, and the result of a sufficient visual acuity is proven.
2. Even when the leucoma affects the whole thickness of the cornea, the transplantation may be tried with hope of success.
3. Totally adhering and prominent leucomata are to be excepted.
4. The operation is absolutely without danger, causes little suffering, and may surely be performed wherever there is any hope of success.—*Am. Jour. of Ophthalmology*, July, 1888.

JAMES E. PILCHER (U. S. Army).

III. Osteo-Periosteal Flaps in Rhinoplasty. By Dr. V. HACKER. Describes a method of forming a bony bridge to the new nose by removing, in addition to the usual forehead flap, a portion of bone and its overlying periosteum, which form part of the flap. The osteo-periosteal portion of flap is chiselled out of the forehead by cutting a narrow groove down to the diploe all around its borders, which should

include a space about 7 to 8 mm, in breadth and in length sufficient, when turned down to rest slightly upon the end of the previously freshened remains of the injured septum, and extend to the septum extremity of the flap. The integumentary portion of the flap should be calculated, as in the older operations, to the particular requirements of each case. A convenient method of fixing the boundaries of the osteo-periosteal portion of the flap is to drive a row of fine pointed pins along them, through the skin, prior to loosening the latter at the edges. A narrow groove of the proper depth having outlined the portion of bone designed for the bony bridge and septum of the new nose, this is lifted up, still attached by its periosteum to the skin, and the point marked where the bridge and septum should join each other, *i. e.*, where the point of the nose is to be formed. At this point the strip of bone is fractured, the periosteal attachments of the latter to the skin being still preserved the lower fragment of bone thus forming the septum when turned directly backward, whilst the other with its upper extremity resting on the remains of the original septum, and its lower joined by periosteum to the lower fragment (articulating with it, as it were), forms the new bony bridge. They are secured in place by means of buried sutures, while the rest of the nose is fashioned in the usual manner by the integumentary portion of the flap.

The dimensions of the bony and periosteal portions of the flap as here given should be rather exceeded than otherwise, inasmuch as considerable shrinking of the same will occur. To avoid an unsightly hump at the point where the new bony ridge rests upon the old one, the periosteum in the flap, at this point, should extend slightly beyond the limits of the strip of bone.—*Wien. klin. Woch.*, No. 2, 1888.

G. R. FOWLER (Brooklyn.)

IV. Treatment of Empyema of the Antrum of Highmore after Mikulicz's Method. By Dr. LINK (Cracow, Galicia, Austria).—At the Fifteenth Congress of German Surgeons (April, 1886), Professor Mikulicz, of Cracow, described a new plan of treatment of suppuration of Highmore's antrum, devised by himself, consisting in establishing a free communication between the latter and

the nasal cavity, by means of a special conically shaped knife. In addition to this means for securing a free issue for pus, he subsequently washed out the antrum by means of a syringe with a bent nozzle. Recently Dr. Link published his two cases where a complete cure had been obtained by Mikulicz's puncture of the antrum with subsequent irrigation. From these cases of his Dr. Link draws the conclusion that Mikulicz's plan is by far better than Stoerk's. The natural nasal orifice of the antrum can be reached by a syringe but with difficulty; besides it is situated too high up to allow a thorough reflux of the pus accumulated in the cavity. The author recommended, further, to perform percussion of the antrum for diagnostic purposes. He takes a smooth cylindrical wooden stick of the size of a finger, fixes one of its ends at the hard palate just above the second molar, and taps with a finger on the other end. When Highmore's cavity is empty, a full resonant tone is heard. When the antrum contains pus or a solid foreign body (or, for the sake of an experiment, water), the percussion sound becomes dull. A closure of the corresponding nostril is said to manifest no influence on the pitch of the tones.—*Przegląd Lekarski* (Cracow, Poland), Feb. 4, 1888.

V. IDELSON (Berne.)

V. Case of Total Extirpation of the Larynx for Epithelioma. By WM. GARDNER, M. D. (Adelaide, Australia.) A man æt. 62, without syphilitic taint, presented a tumor of the larynx which was found to be epitheliomatous upon examination of a piece removed with the laryngeal forceps, and the following operation was performed. An incision was made in the median line, from the hyoid bone to the second ring of the trachea, and the tissues were gradually dissected back from the sides of the larynx. On the right side, the superior cornu of the hyoid bone was dissected out, and the left was cut through at the base, as the light was bad on that side of the patient. The fascia attached to the thyroid cartilage was set free without dividing the thyro-hyoid membrane. Pressure forceps were applied to all bleeding points, and general oozing was reduced by the application of hot sponges. The trachea was then divided between the cricoid

and its upper ring, but owing to calcification of the cartilages, the rectangular tube could not be inserted. A large tracheotomy tube was then introduced, the larynx dissected up from the œsophagus and removed, the epiglottis being cut through at its base. The superior thyroid arteries were caught up by forceps and tied before complete separation was effected. The wound was dusted over with iodoform, and covered above the tube with absorbent wool. The tube was then fixed securely with tapes. The time occupied by the operation, from the commencement of the administration of chloroform, was fifty-five minutes.

The patient rallied well from the operation, and although nearly moribund from the blocking of the tube on the following day, he was readily resuscitated and passed on to a good recovery, and after eighty days was able to go about the streets unaccompanied. The upper part of the wound had closed and he wore a large tracheotomy tube which was cleansed twice daily. He could articulate sufficiently with the lips to make himself understood, and the patient refused to have the upper part of the wound reopened for the insertion of the vocal apparatus, preferring to remain as he was rather than run even the slightest risk. There was no recurrence of the disease and deglutition was perfectly performed. Removal of half the larynx was in this case contraindicated by the location of the growth near the middle lined. The author recapitulates as follows :

"1. The great object to be aimed at is to remove the disease so completely as to prevent the probability of a recurrence *in situ*, and this can be best attained by the extirpation of the whole larynx.

"2. The next object to be aimed at is the prevention of blood and pus passing down from the wound above into the trachea, and the complete removal, with the immediate insertion of a rectangular tube, fitting the trachea closely, is the method best calculated to secure this end.

"3. It is also very important to have the anæsthetic administered at some distance from the wound during the latter stages of the operation, and for this purpose a rubber tube, fitting on to the rectangular tube, and carried out to the shoulder meets the indication fully.

Anæsthesia is then maintained without in the slightest degree interfering with the operation.

"4. In spite of statistics, I do not believe that a partial excision is *prima facie* more likely to be successful than a total extirpation, and the apparent improvement in results is probably due to the fact that the partial excisions were done by operators who had had previous experience in total extirpation.

"5. Lastly, I believe that removal of the whole larynx lessened the risk of perichondritis."—*Australian Medical Journal*, May, 1888.

JAMES E. PILCHER (U. S. Army).

VI. Cyst of Left Vocal Cord. By CHAS. W. HAYWARD, M.D. (Liverpool.) Patient was a female aged forty-three, healthy in appearance, markedly hoarse, had been so for six months, and it was getting worse. Larynx normal, except left cord. On the middle three-fifths of the cord for its entire breadth was a cyst, rounded in contour and sloping off at the ends, about one-eighth of an inch in thickness. Translucent and slightly striated in appearance. A ten per cent. solution of cocaine was painted on and the cyst incised with Schrotter's guarded inter-laryngeal knife. Clear mucus exuded. The cyst wall was pulled out by Schrotter's pincette and the inside touched with solid nitrate of silver, very little pain was experienced. The larynx was pencilled with weak solution of nitrate of silver for a few days. In about a fortnight the patient returned home, hoarseness almost disappeared and the cord looking very nearly normal.—*Lancet*, September 15, 1888.

H. H. TAYLOR (London.)

VII. Contributions to the Study of the Indications for Thyrotomy and Laryngotomy for Cancer of the Larynx. By CH. MONOD (Paris) and M. RENAULT (Paris.) From observations made upon a patient suffering from cancer of the larynx and who died following a preliminary trachotomy, the authors state the following indications for the treatment of this disease: 1st. As soon as there is only a suspicion of the disease, the patient should be informed of the dangers to be apprehended in order to be on his guard. 2nd. In

order to help clear up the diagnosis, antisyphilitic treatment in doubtful cases, should be instituted. 3rd. Tracheotomy, as low down as possible, should be performed. The patient thus becomes accustomed to the presence of the tampon cannula. At the same time for the purposes of a histological examination of the growth, a small portion should be removed *per os*. 4th. Should this examination give but a doubtful result, still the operation should be performed as quickly as possible. Simple thyrotomy or either partial or complete laryngectomy, according to the conditions found, should follow.—*Gaz. hebdom.*, No. 50, 1887.

G. R. FOWLER (Brooklyn.)

EXTREMITIES.

I. Colloid Cancer of the Hand and Forearm. By DR. IVANOFF (Varna, Bulgaria). A turkish peasant, æt. 36, of a healthy family, was admitted to the Varna District Hospital in a highly cachectic state, with a dark, soft, partly fluctuating, roundish tumor of the size of the patient's head, discharging a thick serous fluid and occupying the whole internal moiety of his right hand, the little finger being embedded totally, the three adjoining fingers only partially (with their dorsal and lateral surfaces). The new growth involved also the ulnar portion of the lower fourth of the forearm. Its surface was extensively ulcerated and partially gangrenous. Close to the tumor, higher up, there was felt another, somewhat lesser, but similarly soft and fluctuating swelling deeply embedded amongst the tissues of the inner side of the forearm, the integuments over it being normal and non-adherent, the subcutaneous veins dilated. The axillary glands were healthy. According to the man's statement about 4½ years before, there had appeared, without any cause, a small tumor, of the size of a bean, situated between the little and ring fingers. Two years later it had attained the size of a hen's egg and became ulcerated, to grow very rapidly thenceforward, while 8 months before his admission he had noticed another swelling on his forearm. In view of the man's state growing alarmingly worse from day to day, Dr. Ivanoff, without delay made an amputation of the limb, about the middle of the humerus.

He rapidly recovered without any fever, the wound healing *per primam* about the 9th day. On the 16th, he was discharged in a greatly improved general state. The dissection of the new growths showed that they invaded the subcutaneous layer, fasciæ, the intermuscular tissue, and sheaths of tendons. The little finger's phalanges were entirely absent, its metacarpal bone being as soft as a fibrous cartilage; the ring finger's phalanges were similarly softened. The microscopical examination proved that the tumor was a typical colloid cancer.—*Meditzinsko Spisanie* (Bulgaria), June 10, 1888.

VALERIUS IDELSON (Berne).

II. Cases of Compound Dislocation of the Ankle Joint.

By MR. CROLY (Dublin). A man was admitted with compound dislocation of the ankle joint which had followed a fall of 20 feet off a straw rick. The fibula and tibia projected externally through a rent in the soft parts. The foot was twisted upwards and inwards. Reduction was effected under ether by the author, the wound was dressed antiseptically and splints applied. In the other case the accident was caused by the patient a coal porter, having his foot caught between the shaft of a coal dray and the horse's side. On admission the tibia protruded four inches through a lacerated wound at the inside of the right ankle joint and the fibula was comminuted. Reduction was effected under ether, a drainage tube inserted, antiseptic drainings used, and the limb placed in a flexed position. Gangrene threatened, but timely incisions were made, and the patient at the time of the report was doing well with every promise of a useful foot.—*Medical Press and Circular*, July 25, 1888.

H. PERCY DUNN (London).

III. Successful Simultaneous Triple Amputations for Railway Injuries.

By JAMES BUCKNER LUCKIE, M. D. (Birmingham, Ala). (1) A colored man, æt. 21, was run over by a locomotive, the left foot and ankle being literally crushed to pieces, the right foot and ankle and the right hand and wrist similarly mangled, together with other severe injuries. The patient was greatly collapsed but the following modified circular amputations were performed: the

left thigh at the lower third, the right leg at the lower third and the right arm at the lower third. The patient made a good recovery, except that a button of bone had to be removed from the right leg two months later.

(2) A man, æt. 32, was run over by a loaded freight car crushing both legs at and a little above the knees and the right arm from the tips of the fingers to above the elbow. The left thigh at the middle third, the right thigh at the juncture of the middle and lower third and the right arm at the middle third were amputated by the modified circular operation. The man rallied well and recovered rapidly delayed only by a necrosis in the stump of the left thigh. In both cases two limbs were amputated simultaneously by the author and Dr. B. G. Copeland.—*Journal of the National Association of Railway Surgeons*, August, 1888.

JAMES E. PILCHER (U. S. Army).

TUMORS

I. Arborescent Lipoma of Sheaths of Tendons. By H. HÆCKEL. A case is related of this rare affection. The patient first noticed a pain in the left index finger three years before coming under observation. All the other fingers eventually became affected in a like manner, and at the same time a well defined swelling upon the dorsum of the finger occurred. This latter varied, at times increasing, and again lessening in size. Crepitation like that due to rice bodies was felt upon movement. The overlying skin was unchanged. Diagnosis, rice body hygroma of the sheaths of the tendons. Upon incision a honey-like fluid escaped. Tendon covered with a light yellow growth of soft consistence, with reddish-yellow spots. The growth was characterized by small prominences partly club-shaped partly grape-like, and with long pedicle.—*Centralblatt f. Chirurgie*, No. 17, 1888.

G. R. FOWLER (Brooklyn).

II. On the Final Results of Cancers of the Face, with the Exception of Cancer of Lip. By DR. OHREN (Wurzburg),

The author has carefully tabulated 72 cases of cancer of face which he has seen, from 1877 to 1887, under several heads :

1. Patients who died shortly after operation.
2. Patients who died from local recurrence.
 - 2 a. Patients who, free from local recurrence, died from cancer of internal organs.
3. Patients now living, with local recurrence.
 - 3 a. Patients who have been operated upon on account of local recurrence, and are now free from it.
4. Patients whose fate has remained unknown.
5. Patients who up to May, 1887, or up to death, have remained free from return of the disease.

This table can be summed up as follows :

1. Died soon after operation	-	-	-	-	-	3
2. Died from local recurrence	-	-	-	-	-	17
3. Died from carcinoma, internal organs	-	-	-	-	-	3
4. Living with local return	-	-	-	-	-	7
5. Living or died without return	-	-	-	-	-	31
6. Not heard from after operation	-	-	-	-	-	11
						—
						72

As to the localization of cancer of face, we find the favorite spot to be the lip, specially the lower lip ; in 1111 cases of cancer of the face tabulated by Winiwater, Billroth and others, the disease occurred 609 times on the lip, while in the 502 remaining cases it was distributed as follows ; nose 157, cheek and chin 143, eyelids 121, forehead and temporal region 81, ear 28 times. As is seen, the next most frequent place after the lip is the nose, specially the ala nasi. In the author's statistics of 72 cases of cancer of the face, the nose was involved 19 times, cheek 9, eyelids 10, temporal region 10, forehead 7, ear 5 times, chin 1, and one case whose starting point was unknown.

Statistics also prove that men are more subject to cancer of the face than women, almost in the proportion of 2 to 1. The author's statistics show that of the 72 cases 47 were men and 25 women.

Carcinoma in general is more frequent around the 60th year than at any other time of life.

In only two cases did Ohren find a reliable history of heredity.

At present it is extremely difficult to give the average period of life, for cases under consideration, when not treated, for nearly all patients have undergone some form of treatment, if not operated on, at least have been cauterized.

The question of recurrence is extremely interesting and important. It has been considered as a cure if the patient remained free from recurrence for a period of three years, though there are some cases of cancer of the face where a local return will take place as late as ten years after removal of original growth.

Thiersch has laid special stress on this point, that the interval between operation and recurrence is less after each successive operation.

Dr. Ohren found that the average period of life after operation on cancer of face was two years after removal of first recurrence. If growth was not removed when it returned the period of life was about two years and two months, whereas by repeated operations the patient's death took place about 16 months after first operation, and the time from the last operation till death was about five months. With each return the prospect of a cure by operation lessens.

The fate of all the patients operated on, in the doctor's statistics is as follows :

	No.	Per Cent.
I. Died after operation - - -	3	4.2
II. Died from recurrence - - -	20	27.8
III. Living with recurrence - - -	7	9.7
IV. Result unknown - - -	11	15.3
V. Died from inter current disease and with- out recurrence. - - -	8	11.1
VI. Living free from recurrence - - -	28	31.9
	—	
	77.	

Carcinoma of the face is relatively more benign than other carcinoma by the reason of its slow growth, and being at first very superficial

The results would be still better than at present (31.9% of cures) if the patient was operated on early. and if the anatomy of the part allowed a wide extirpation of the disease by removing much of the surrounding and apparently healthy tissues.—*Archiv f. klinische Chirurgie*. Bd. 37. Hft. 2.

F. C. HUSSON (New York).

III. Enchondroma of the Shoulder. By DR. GRISSON (Rostock). This is the history of a case of enchondroma of the shoulder involving the scapula and clavicle and extremity. The tumor was of very large size and had already been operated upon by Trendelenberg. The second operation in the clinic of Rostock was in every way successful. The case has already been published by Gies, (*Deutsch Zeitsch* bd. xvi). Enchondroma of the shoulder necessitating removal of the scapula, clavicle and extremity occurs only four times in the literature. Three of these cases recovered, the fourth (Thiersch) died after operation.—*Deutsch Zeitsch f. Chir.* bd. 27, heft 3 and 4.

HENRY KOPLIK (New York).

GYNECOLOGICAL.

I Congenital Deficiency of the Recto-Vaginal Septum. Operation; Cure. By DR. McMORDIE (Belfast). The patient, æt; 25 years, single, gave the following history. Catamenia appeared at the age of 16, and since then she had not menstruated more than seven times. Under an anæsthetic the vagina was found to be very small, and the hymen intact. A finger of one hand being passed into the vagina, lumps of hardened fæces were found in the upper part close to the cervix uteri. A finger of the other hand being introduced into the rectum, it passed through an opening in the vaginal septum, and met the other finger in the vagina. The opening was about the size of a sixpence and about one inch from the anus. The edges were freely pared toward the vagina and brought together with silver wire. After three weeks she was discharged cured, the union being perfect.—*Lancet*, July 28, 1888.

II. PERCY DUNN (London).

II. Total Extirpation and Amputation in Carcinoma of the Uterus. By DR. A. W. C. BERNIS (Amsterdam). This is an exhaustive critique of the relative value of the methods of total extirpation of the uterus, either by Freund's method or the vaginal method, and the supravaginal or high amputation of the cervix uteri for carcinoma. In cases of carcinoma of the body the vaginal total extirpation is indicated, if the body of the uterus is not excessively large and capable of being delivered through the pelvis. In beginning carcinoma or canceroids of the cervix the various schools are still antagonistic as to the proper course. If there is a return of the disease in supravaginal (high) amputation of the cervix the author maintains that the best interests would be subserved if in all cases the total extirpations were always substituted for the supravaginal amputation. Certain it is that by the total removal of the organ (uterus) the chances of a return of the disease are much reduced. Those cases recorded by Ruge and Veit in which the supravaginal amputation has secured to the patient an immunity from return of the disease, are, by their own admission, erosions of the cervix just beginning, if at all, to degenerate (?) into carcinoma. In well marked canceroids of the portio Hofmeier also has recorded a return of the disease in a large percentage of supravaginal amputations. The author says that the future statistics will favor, in the hands of advanced operators the total extirpation. He appends 15 cases of carcinoma of the cervix and body, operated upon in his clinic under these principles. In eight of these cases the disease involved the cervix only; author here performed total extirpation of uterus.—*Zeitsch f. Chir.* bd. xxvii, heft. 5 and 6.

H. KOPLIK (New York).

III. Hydrosalpinx. A New Mode of Electrical Treatment. By DR. S. APOSTOLI (Paris). The following is the author's summary of the case (abbreviated). Patient, æt. 25 years, general health good. Three full natural pregnancies; abortion at two months on Sept. 21, 1887, (20 days after violent fall on back). Then, incessant pain, violent menorrhagia, general ill health, sharp pain in right iliac fossa; no antiseptic precautions. Oct. 27, came to clinic. Swelling of whole

upper part of vagina with fluctuation on the right side. Oct. 27, first galvano-puncture, negative, on left side, vaginal, 100°, five minutes. Remained in bed 48 hours, with some relief on the following days. Nov. 2, second galvano-puncture, negative, vaginal, in the *cul de sac*, right side, one centimetre, 140°, 5 minutes. Two days later spontaneous opening of cyst and discharge of fluid, no pus or blood. End of pain and diminution of swelling. Nov. 15, first appearance of menstruation since abortion; flow continued for three days, pain on left side only. Since then all has been natural, locally and otherwise, and patient worked hard even at menstrual periods.—*Brit. Med. Jour.*, May 12, 1888.

C. B. KEETLEY (London).

IV. Tubal Pregnancy. By LAWSON TAIT F. R. C. S. (Birmingham). Patient, æt. 27 years, married six years, but never pregnant, menstruated regularly till Christmas, then she had missed till March, during the whole of which time she was confined to bed by what she called inflammation of the womb. She recovered enough to get up, but on the second day of her getting out of bed she was suddenly seized with acute, violent pain, which from the description was probably an acute attack of peritonitis. Soon after a tumor was recognized on the left side of the uterus. Had several attacks of peritonitis. When seen by Mr. Tait she was emaciated, in constant pain, quite unable to get about, and evidently suffering from pus in the pelvis. Examination revealed a tumor as large as a foetal head on the left side of the pelvis. Suppuration of left Fallopian tube was diagnosed, no idea of pregnancy being entertained. The abdomen was opened, and the following state disclosed: Omentum glued over contents of the pelvis and below it several coils of intestine adherent, on removing these a cavity was opened up containing a quantity of extremely fetid, purulent fluid. Cavity was as large as a Jaffa orange, and a mass was encountered easily recognized as a piece of placenta. It was now seen that the cavity was a dilated Fallopian tube, forming the anterior, posterior and lower walls, whilst the upper part was formed by the coils of intestine and omentum. All round the cavity were

sharp hard points, foetal bones embedded in cyst-wall. The part of the cyst formed by the Fallopian tube was removed and the pedicle tied. The presence of fibroid proved conclusively the accuracy of the above supposition. This case proves what was not known certainly before: that rupture of a tubal pregnancy into the peritoneal cavity is not necessarily fatal. Such cases no doubt are very rare. Although it is possible to conceive that absorption of the contents of the cyst might take place, yet the danger of the occurrence of suppuration, as in the above case, is so imminent that it is not safe to leave such cases alone. Besides the Fallopian tube could never have resumed its function and for years would have been liable at any moment to suppurate. The patient made a good recovery, and Mr. Tait recommends the removal of the tube together with the remains of pregnancy in all cases. He has drawn up the following table:

Scheme of ectopic gestations in tubo-ovarian tract:

1. Ovarian, possible, but not yet proved.

2. Tubal in free part of tube, and is;

(a) Contained in tube up to the fourteenth week, at or before which time *primary* rupture occurs, and then the progress of gestation is directed into.

(b) Abdominal or intra-peritoneal gestation, uniformly fatal, unless relieved by abdominal section, primarily by hæmorrhage, secondarily by the suppuration of the ruptured sac and peritonitis.

(c) Broad ligament, or extra-peritoneal gestation.

(d) May develop in broad ligament up to full time, and be removed at viable period as living child.

(e) May die and be absorbed as extra-peritoneal hæmatocele.

(f) May die, and the suppurating ovum may be discharged at or near the umbilicus, or through the bladder, or intestinal tract.

(g) May remain quiescent as lithopædia.

(h) May become abdominal or intra peritoneal gestation by secondary rupture.

3. Tubo-uterine or interstitial is (a) contained in the part of the tube embraced by the uterine tissue, and so far as is known, is uniformly fatal by intra-peritoneal rupture (as b) before the fifth month.

Mr. Tait adds: "The above scheme gives a complete consistent story of the pathology of ectopic gestation, so far as I know it, and it certainly removes an enormous amount of the confusion which has hitherto existed concerning it, and many of the difficulties encountered in the treatment.—*Lancet*, Sept. 1 1885.

H. H. TAYLOR, London.

BONES, JOINTS, ORTHOPÆDIC

I. A Contribution to the Treatment of Traumatic Separation of the Epiphysis of the Upper End of the Humerus, etc. By PROF. HELFERICH (Griefswald). The rare cases of traumatic separation of this epiphysis have sometimes been confounded with luxation of the head of the humerus. Pathological collections furnish numerous examples in which union of the epiphysis and diaphysis have occurred, in this class of cases. He communicates the following case: A lad of 16, while wrestling, fell violently and struck upon the left shoulder. The head of the humerus was found in its normal position under the acromion, while the rounded upper end of the shaft was displaced forward and inward, under the coracoid process, from which position it could be slipped up and down, and when strong downward traction was made, soft crepitus was developed. An apparent shortening of the arm of 1½ cm. was observed. An attempt at reposition proved unsuccessful, owing to the interposition of soft parts between the fragments, and an incision into the joint was practiced. The upper end of the humerus had penetrated into the axilla through a button-hole slit in the capsule, which latter it was found needful to enlarge before reduction could be accomplished. The fragments were then fastened together with a long awl-shaped steel pin, which projected beyond the surface at the line of sutures. This was removed at the first change of the dressings, at the end of eight days. The shoulder-joint regained its function in a short time.

The literature of the subject reveals only one similar case, that reported by Lange, of New York (*ANNALS OF SURGERY*, March, 1883). Esmarch communicated, however, at an earlier date, an operative procedure for compound dislocation of the humerus at the shoulder-joint,

and Burns reported two cases in which operation was finally resorted to in old separation at the epiphysical line, complicated with dislocation. The cases of Lange and Helferich, however, are unique in that operative measures were resorted to as an immediate method of treatment.—*München. Med. Woch.*, No. 40, 1887.

G. R. FOWLER (Brooklyn).

II. Double Luxation of the Clavicle. By DR. C. KAUFMANN. The great rarity of luxation of both ends of the clavicle at the same time is shown by a study of the literature where we find only eight cases. In three cases (Porral, Morel-Lavallee, Lund) the right clavicle and again as often (North Col and the Author) the left clavicle was dislocated. In two cases (Hutchinson and Gross) we have no data given. In seven cases the injury occurred in men. In all a severe traumatism caused the accident—a severe force acting from behind and externally on the one shoulder while the other shoulder was fixed by a firm resistance. The force caused a pressing together of both shoulders with a torsion of the body around the fixed shoulder in a direction from behind forward. The above applies to four of the eight cases. In three cases a fall on the shoulder is the causal factor. A peculiar tenacity of the tissue of the particular clavicle dislocated is thought by Porral to favor this accident rather than fracture. The aspect of the patient is characteristic after this dislocation and palpation fixes the diagnosis. The functional result was good in all cases after recovery. In one case at least it was possible to replace and retain the bone in position until complete cure resulted. The remaining cases recovered after the manner of non-reduced clavicular dislocations. The double dislocation of the clavicle is more common than the same dislocation of any other bone in the skeleton if we can conclude from cases in the literature. Only isolated cases of double dislocation of other bones are recorded.—*Zeitsch. f. Chir.*, bd. 28, heft 24 and 5.

HENRY KOPLIK (New York)

III. Compound Fracture of the Patella Treated by Suture. By W. F. HASLAM (Birmingham). The patient, a man æt. 30, fell through a skylight on to his left knee, a distance of eighteen

feet, sustaining a scalp wound over the forehead, a wound of the nose communicating with a fracture of the nasal bones and a compound fracture of the left patella. Shortly after admission the wound over the knee was enlarged by a vertical incision. The soft parts were found to be much bruised. The patella was fractured transversely about its centre, and there were four small fragments almost entirely detached from its outer border, the joint was full of blood. The wound was carefully cleansed; the joint being washed out with 1-40 carbolic solution. The loose fragments of the patella were removed, and the two remaining ones were sutured with a single stout suture wire. A large drainage tube was inserted on either side of the joint; others were placed outside the capsule; the skin wound was united with wire sutures and a tube placed at each end. The carbolic spray was used. No complication of any moment occurred during the subsequent progress of the case. The sutures fixing the fragments were removed at the beginning of the third month, and the patient was subsequently discharged to a convalescent home. The wound over the joint healed soundly, eventually, the delay in healing having been due to the injury received by the soft parts at the time of the accident. The patient refused to permit any attempts at passive motion being practiced, being perfectly satisfied with a stiff knee. On his discharge seven months after the accident he returned to his former occupation as a porter, in which he has been doing from 12 to 14 hours work daily ever since. At the present time the knee is firmly fixed in a slightly flexed position, the patella has united by bone, and can be moved a very little from side to side.—*British Medical Journal*, July 21, 1888.

H. PERCY DUNN (London).

IV. Resection of the Fragments and Bone Suture in the Treatment of Pseudoarthrosis of the Thigh. By PAUL BERGER (Paris).—The author gives a resumé of the principal difficulties and dangers in the treatment of pseudoarthrosis by the method of resecting and suturing the ends of the fragments as follows: 1. The tendency of the fragments to dislocation. 2. The inherent defects of the metal suture, the liability of the latter to break or stretch, and its tendency to cut its way into the bony parts, and thus render insecure

the adaptation of the fragments. 3. The metal thread, with its ends passed out through the wound, forms a conducting medium for the entrance of germs to the deeper parts of the wound. 4. The difficulties in the way of subsequent removal of the wire.

In order to effectually overcome these difficulties, B. recommends a **V**-shaped freshening of the upper end of the lower fragment, and a correspondingly wedge-shaped freshening of the lower end of the upper fragment in such a manner as to enable the latter to be indented with the former. Before the final adaptation of the fragments, holes for passing the metal sutures are to be drilled.

As material for suturing, he uses strong platinum wire, the advantage of which, it is claimed, consists in the fact that it may be thoroughly disinfected by heat or strong acids just prior to its use, without impairing its tensile strength. The ends of the wire, after twisting, may be cut off closely and left under the periosteum, which latter is to be sutured by catgut. For purposes of fixation, an anterior and posterior splint, preferably of plaster-of-Paris, is applied.

It may be said, in criticism of this method, that in case of obliquely inclined ends of the fragments, the necessity for removal of a considerable portion of bone in order to achieve the object aimed at, will almost inevitably lead to more than the usual amount of shortening observed in this class of cases.— *Revue de chirurgie*, No. 10, 1887.

G. R. FOWLER (Brooklyn).

REVIEWS OF BOOKS.

MITTHEILUNGEN AUS DER CHIRURGISCHEN KLINIK ZU KIEL. IV.

Herausgegeben von Dr. FR. VON ESMARCH. 1888. Kiel und Leipzig. Lipsius & Tischer. New York, G. E. Stechert.

MEMOIRS FROM THE SURGICAL CLINIC IN KIEL.

The fourth volume of the contributions to general surgery from the University of Kiel, contains three papers, all of interest.

1. *What are the Final Results after Resection of the Knee-Joint since the Introduction of the Antiseptic Method of Treating Wounds and the Constricting Hæmostatic Bandage.* By Dr. F. Hitzegrad. A statistical paper, written with a view to more accurately determine the indications for resections (as opposed to arthrectomy) in the knee-joint. Complete arthrectomy, it will be remembered, was recommended by v. Volkmann and by Koenig at the 13th Congress of German Surgeons, in place of resection, for all cases below 14 years of age. The author collects 115 cases of resection done at Kiel, and comes to the conclusion that resection should be upheld, when done antiseptically and with the Esmarch bandage; 73 per cent of the severe cases were cured in an average of 85 days; and 91 per cent of the patients dismissed as more or less completely cured, had a good use of the limb after five years and a half. The paper is illustrated by a number of photogravures.

2. *Contributions to our Knowledge of Syphilomata of the External Muscles.* By Dr. August Bier. Describes twelve cases of syphilitic tumor of muscles and discusses their characteristics. Most of the cases are from Prof. Esmarch's clinic. Four of the gummous tumors were situated in the sterno-cleido-mastoid muscle, six in the extremities, and two on the trunk. He found the tumors quite hard; pain at nights generally present. He advises an exploratory incision and microscopic examination of an exsected piece.

3. *A Case of Acromegalia.* By Dr. Aug. Bier. A farm-hand, 31 years of age, in whom different portions of the extremities, the nose, the pectoral glands, etc., became enlarged at successive dates in the course of ten years.

GEGENWART UND ZUKUNFT DER ANTISEPTIK UND IHR VERHAELTNISS ZUR BAKTERIOLOGIE. VON DR. J. NEUDOERFER, *Klinische Zeit.* und Streitfragen, herausgegeben von Prof. Dr. Joh. Schnitzler. 1888. Wien. Wilh. Braumüller. New York, G. E. Stechert.

PRESENT AND FUTURE OF ANTISEPSIS AND THEIR RELATION TO BACTERIOLOGY.

The author of this pamphlet (42 pages) first gives a general review of the present theories and methods of antiseptic practice in surgery, in which he gives prominence to several of the newer antiseptic substances such as antipyrin, chinolin, sozo-iodol, kreolin, etc.

Then, proceeding to discuss the action of antiseptics in preventing sepsis, he theoretically constructs a number of interesting hypotheses as to the requirements and probable future of antiseptics.

Believing inflammation due to some "irritation" of the nervous system, he looks to the bacteria as exerting such an influence upon the sympathetic and trophic nerves. Iodoform, in his opinion, has an antiseptic action, because it renders sympathetic nerve-branches insensible to irritations of this kind.

Finally he points out that all our future knowledge and understanding of the nature of the vital principles of life, disease and death, must be the outgrowth of a more minute study of the physiology and pathology of the blood corpuscles. He quotes Mosso (who believes the leucocytes to be changed red corpuscles) and Heitzmann (who can diagnose the personal constitution from the appearance of the corpuscles), to show how far superior the study of the blood is to the study of bacteriology. Different irritaments (among which bacteria play but a small part) cause different changes in the blood-corpuscles—and this gives rise to the various physiological phenomena, which we in vain endeavor to comprehend before we have mastered the subject of the blood-corpuscle.

The theories advanced are not substantiated by any original experimental work of the author.

ALLGEMEINE CHIRURGISCHE SEMIOTIK UND DIAGNOSTIK. VON DR. OSCAR WITZEL. 1888. Bonn, Max Cohen & Sohn. New York, G. E. Stechert.

GENERAL SURGICAL SYMPTOMATOLOGY AND DIAGNOSIS.

This book (173 pages) contains the symptoms and differential diag-

nosis of the most frequent surgical affections, and directions for making the necessary examinations in these cases.

The contents of the book are divided as follows: (1). Injuries and their sequelæ. (2). Inflammation and its sequelæ. (3). Tumors. (4). General method of examination.

No special forms of injuries are described; the treatment of the subjects is general throughout. Thus only the general symptomatology of fractures is given, no special forms being mentioned.

The author has made the descriptions of the subjects treated as short and concise as possible, and by limiting himself to the symptoms and diagnosis of the various affections, has succeeded in disposing of them in a very small space.

No fault can be found with the teachings presented; they are the accepted maxims of the present day.

The book is the outcome of the author's lectures during a five years' experience in instruction to students at the University of Bonn; it is inscribed to Prof. Tredelenburg, whose student the author was, and reference is made in the preface to his teachers, Bardeleben and v. Langenbeck.

The intention of the author was to offer the practitioner a useful guide in the examination and appreciation of surgical cases; but whether the book will be as great a favorite with practitioners (who look for something more by way of information in a given case) as with students and instructors, remains to be seen.

ZUR ERINNERUNG AN BERNHARD VON LANGENBECK. Rede gehalten von ERNST VON BERGMANN am 3, April. 1888. Berlin. Aug. Hirschwald. New York, G. E. Stechert.

MEMORIAL ORATION UPON B. VON LANGENBECK.

The above oration was delivered before the German Surgical Society and the Berlin Medical Society, to both of which v. Langenbeck was president for many years. It now appears in pamphlet form, 95 pages including the numerous notes.

The author compares the honored surgeon with Emperor William; while the latter was uniting Germany and raising it to an empire, v. Langenbeck was doing something similar for German surgery.

With some details of the life of v. Langenbeck, the author gives valuable hints of the history of German surgery. He dwells upon three special features of v. Langenbeck's life-work. (1.) The fact

that he was first lecturer on physiology and an expert in microscopical anatomy before he turned to surgery, gave to German surgery its present status. (2.) Langenbeck opened up new operative fields by original work. (3.) He advanced German military surgery.

The notes contain extracts from Langenbeck's writing, a list of his works, a list of his titles and military honors, etc.

W. W. VAN ARSDALE

CONTRIBUTION TO THE SURGERY OF CEREBRAL TUMORS.

By LEWIS S. PILCHER, M.D.,

OF BROOKLYN.

SURGEON TO THE METHODIST EPISCOPAL HOSPITAL; PROFESSOR OF CLINICAL SURGERY
IN THE NEW YORK POSTGRADUATE MEDICAL SCHOOL AND HOSPITAL.

A ROBUST, finely formed man, A. P. æt. 33 years, was referred to me for surgical treatment, in October, 1888, by his physician, Dr. Chas. Corey, in consequence of mental and convulsive symptoms which had gradually developed after a blow on the head, for which reason it was hoped that operative interference might be successful in relieving them. The history as then ascertained was as follows :

In the spring of 1882 he was thrown from a carriage and struck his head on a curbstone. There is no record of the immediate effects of the injury, but he certainly had no paralysis following it. In the year following it he was noticed to have become more irritable, childish and apathetic in character, quite in contrast to his condition before the injury. In the fall of 1884, about two and a half years after the injury, he first had a convulsion. This was general in character. The brother says that he fell down stairs in it. Became unconscious and "blind."

He had several of these at intervals of about a month with frequent intermediate attacks of petit mal. This continued for about a year, when he took a patent epilepsy cure and remained free of convulsions till June, 1888. He had continued to have, however, at rare intervals, the petit mal attacks, in which he became more or less unconscious or dizzy, with staring eyes, but no convulsive movements.

In June, 1888, he had another severe convulsion with loss of consciousness for half an hour or more. Since then he has had no severe attacks, but has had abortive or mixed attacks very often, sometimes several daily. He has also suffered from attacks of severe frontal and vertical headaches, but without nausea or vomiting. He has become very apathetic, never volunteers to speak, and only answers in the briefest way. He will sit quietly in a chair nearly all the time. He

does not get maniacal or show delusions. His sleep is disturbed (by headaches and the attacks)? His appetite is fair, and his bowels very constipated. His bodily functions are performed as are those of an infant, without regard to surroundings and without attempts at cleanliness.

Oct. 13, 1888. An ophthalmoscopic examination was made by Dr. Arthur Mathewson, who reported vision of about $\frac{20}{200}$, with very much swollen condition of both optic nerves, "choked disks." Upon these appearances Dr. M. expressed the opinion that some coarse intracranial lesion, probably tumor, was present, but expressed no opinion as to localization.

Oct. 16, 1888. An examination was made by Prof. C. L. Dana, who reported as follows:

The patient is strongly built, walks rather slowly, and with a little limp or sign of stiffness on the right side. He answered questions sometimes correctly and sometimes not. Often he seems unable to understand the simplest directions. His face shows no paresis. The tongue is protruded straight. The arms are weak; right hand 35, left 30; a slight tremor shows in each equally. The tremor increases on volitional movement. The reflexes are a little exaggerated, but there is no inco-ordination. The legs show also slightly exaggerated reflexes, but no ankle clonus. The right knee-jerk is somewhat greater than the left. There is no evidence of ataxia, but on making him walk with closed eyes he tends toward the left. The lower limbs are fairly strong and the patient can walk at least half a mile.

The patient's hebetude is so great that it is impossible to be certain whether there is any tactile or pathic anæsthesia; if present, it is slight.

There is some unequal innervation of the eye muscles. The patient occasionally looked cross-eyed to the right. Special tests failed to find any special paresis. Pupils equal, responding to light and accommodation. Impossible to tell positively whether there is any hemianopsia, or restricted visual field; probably not. The sense of hearing is good in each ear.

The patient, though he spoke little, did not seem to have any aphasic disturbances. The record would be as follows: Aphemia, none; agraphia, present—he could not write, but probably from his utter imbecility; word-blindness, his difficulty in reading ought to be due chiefly to visual defect; though at times he did not seem to comprehend the simplest questions or directions.

The patient, while seated, would be constantly yawning or stretching. He had the peculiar physiognomy of cases of intracranial tumor.

Examination of the head showed an old scar just below the left parietal boss (See Fig. 1). This would place it over the angular gyrus or adjacent part of the posterior tem

Description of abortive epileptic attack. One of these attacks came on in the consulting room of Prof. Dana. The patient uttered no cry and made no decisive movement. The pupils dilated; the head and eyes turned to the left: the right leg straightened, the right hand closed and the forearm flexed. These movements were not clonic, or even strongly tonic. The fingers could be unbent and the arm straightened. The patient was not, strictly speaking, conscious, yet he responded to questions slightly. The movements would last a minute, then change, the patient moving restlessly in the chair. The face was not changed in color. After about ten minutes the attack ceased, the patient stood up and said he felt all right. He did not remember what had occurred.

Upon the recommendation of Prof. Dana, the patient was given potassium iodide, beginning with 15 grains three times daily, and increasing five grains daily until a maximum dose of one drachm three times daily was reached. This treatment was maintained for 15 days without effect other than an aggravation of all his symptoms. Medicinal treatment was therefore suspended, and the patient was admitted into the Methodist Episcopal Hospital, Nov. 5, for further observation, and operation if it should be deemed best.

Nov. 7. An extended examination was made by Dr. W. W. Brown, with results merely corroborating those already reported by Prof. Dana.

A positive opinion was expressed by both these neurological experts that a tumor of the brain existed in this case. Its localization however could not be definitely made from the symptoms presented. These symptoms, also, they were of opinion were not inconsistent with the existence of a tumor in the angular gyrus, or its immediate vicinity, being the site where previous injury was known to have been sustained. In view of the hopeless condition of the man, and the positiveness of the diagnosis as to the character of the disease, an exploratory operation at the point of injury was both deemed justifiable and recommended.

During the few days that intervened between the reception of the patient in the hospital, and the operation that was done upon him, no special change in his condition was noted. He slept and ate well; he lay or sat apathetically wherever he was placed; he was tractable; he urinated and defæcated in bed or wherever he might be when the desire came upon him; the convulsive seizures were frequent.

Notwithstanding the indefiniteness of the localizing symptoms I determined to submit him to operation, choosing the site of the known external injury for the attack, for the following reasons :

1. Injuries of the skull are a recognized cause of the development of diseased growths in the brain. 2. The location of such tumors usually corresponds to the site of the previous skull injury. 3. The patient, except as regards his animal functions, was already practically dead, and the hopelessness of the prognosis made justifiable the assumption of extreme risks, provided they were attended with the slightest possibility of advantage to him. Accordingly, Nov. 9, 1888, I



FIG. 1. SHOWING SITE OF OLD CICATRIX AND LOCATION AND CHARACTER OF THE PRIMARY SCALP INCISION.

proceeded to operate as follows : In the operation I was assisted by Dr. J. B. Bogart and the house-staff of the hospital, there being present also many of my colleagues of the hospital staff and also Drs. Corey, Dana, Shaw and Browning, who were interested in the neurological aspects of the case. The patient's scalp had been shaven two days previously, and thoroughly scrubbed and disinfected. The fol-

lowing antiseptic precautions were adopted: All instruments boiled. Absorbent dressing materials boiled. Usual antiseptic precautions to the field of operation and to the hands of the operators.

A curved incision was made, convexity upwards; beginning at the mid-temporal region, it was carried upwards and backwards to within an inch and three quarters of the sagittal suture, then downwards and backwards so as to make a flap four inches across at its base and four inches from above downwards (Fig. 1), at the centre of which was the

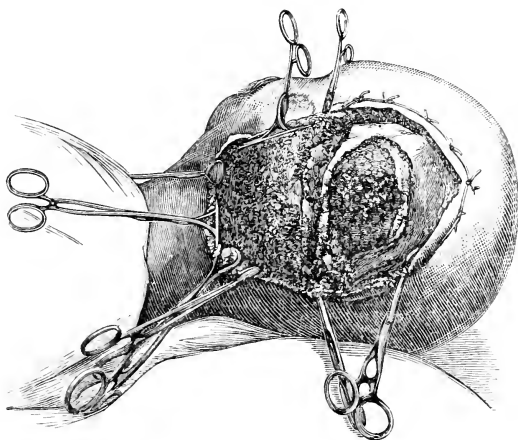


FIG. 2. SHOWING FLAP REFLECTED, CRANIAL WALL OPENED, AND BRAIN PROTRUDING, (from a photograph.)

scar of injury. Hemorrhage was controlled at the edges of the flap by pressure forceps; from scalp edges by rapidly applied sutures, forming temporary mass ligatures (Fig. 2). The periosteum was included in the flap, which was then reflected downwards, exposing the denuded cranial wall. A one inch trephine was applied to the parietal bone at the point which lay under the scalp cicatrix, which point had been marked by punctures with a drill previous to the reflection of the flap. The cranial vault presented no depression, nor other sign of previous injury. The first button of bone having been removed a second similar one was removed behind it and on the same level with it. The

opening thus made was further enlarged by the removal of a three quarter inch button of bone above and below the points of intersection of the two first trephine openings. Projecting angles were removed with a rongeur so as to convert the whole opening into an oval opening with smooth edges. The buttons and bone fragments as removed were placed in recently boiled distilled water, the receptacle containing which was kept in a warm water bath. The dura mater thus exposed was normal in appearance, projected into the opening tense, and without pulsation. It was divided throughout the lower three-fourths of the circumference of the opening and the flap reflected upwards, the section being made three sixteenths of an inch from the edge of the opening in the bone. Immediately on the reflection of this flap, the brain substance projected strongly through the opening with such force as to tear the cortical portion at the anterior margin of the opening, making a rent a quarter of an inch deep.

The tissue presenting being normal and the intracranial pressure evidently being in front of the point of opening in the cranial wall, the opening was enlarged toward the front by the removal of another inch button and by the rounding off of the corners by the rongeur as before. The dura was reflected as before. There was now an opening through the cranial wall oval in shape, three inches in its antero-posterior diameter by two and a half from above downwards. Through this the brain tissue projected, forming a tumor the size of half an egg, without pulsation, normal in appearance. (Fig. 2.) Palpation elicited no evidence of deep seated induration. Careful separation in the line of the sulci was negative in its results. With the advice of the neurological experts present a delicate exploring trocar and needle was passed into the brain tissue in various directions, the furthest excursion of the needle being posteriorly two and a half inches and anteriorly three and a half inches. The result of these explorations was negative. As the needle was passed anteriorly to a depth of about two inches, a sense of slight elastic resistance was perceived which was overcome with slight pressure after which the needle passed on as before. This elastic resistance was due, as was afterwards plainly demonstrated, to the pia mater covering in the surface of the convolutions in the fissure of Sylvius, which was transfixed by the needle. It being now abundantly demonstrated that there was no tumor in the region of the brain accessible from the point of operation, further attempts at exploration were suspended.

The projecting cerebral mass was so great in volume and so tense, that there was no possibility of returning it within the cranial cavity, nor of

covering it by the dural flaps. Accordingly, after due consultation with colleagues present, it was sliced off down to the level of the bone. Slight hemorrhage from minute arterioles in the pia was arrested by delicate catgut ligatures, the adjustment of which was attended with much difficulty owing to the delicate and fragile nature of the tissues. It was finally, however, satisfactorily done. The flaps of dura were now brought down into place and secured by catgut sutures to the cut edge of the peripheral dura. A gap between the flaps was left amounting to about one fourth of the opening. Upon the surface of the dura, the parts having been thoroughly cleansed by irrigations of warm distilled water, were now placed four of the buttons of bone, two large and two small, which had been kept warm and sterile up to this moment. Two fine rubber drains were placed so as to reach from the interval between the dural flaps to the lower posterior angle of the scalp wound.

The pressure forceps were now, one by one, removed from the scalp flap, any vessels still requiring ligature were secured and the flap laid up in place and secured by sutures throughout its whole extent, except at the point of emergence of the drainage tubes.

The parts were enveloped in a mass of gauze, which had been sterilized by boiling. The entire time occupied by the operation was two hours and a half. At the close of operation, the patient exhibited considerable shock. Pulse 152.

Under the use of digitalis and alcohol, and external heat he rallied slowly. As the effects of the anæsthetic passed off, paralysis of right arm and leg was noticeable.

7:30 P.M. Pulse 123. Ordered enemata of beef peptonoids.

11:25 P.M. Temperature 100°. Pulse 120.

Nov. 10, 8 A.M. Lies in a quiet stupor. When spoken to sharply, appears to recognize what is said. Takes nourishment by the mouth and retains it.

2 P.M. Begins to rub abdomen as if in pain. During the remainder of the afternoon was quite restless. At midnight pulse has risen to 160.

Nov. 11, 1 A.M. Breaths heavily. Hand wanders constantly to head.

2:30 A.M. Unable to swallow.

3 A.M. Great dyspnœa has developed. Beginning œdema pulmonum. Dry cups over chest. The œdema of lung progressed in intensity and extent, pulse weak and 160.

7:30 A.M. Death by respiratory failure, 38 hours after completion of operation.

Autopsy.—Five hours after death. Report of Dr. Hodenpyl, the pathologist of the hospital. Rigor mortis only slightly developed. Body well nourished, brain only examined. Dressings when removed found to be stained with reddish serum, no pus about the wound,

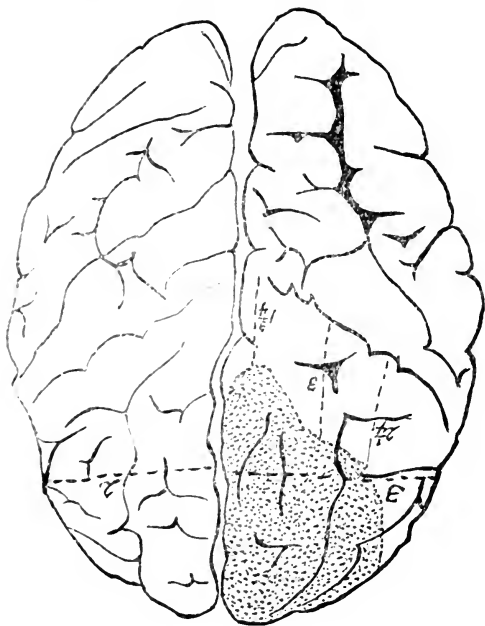


FIG. 3.—SUPERFICIAL RELATIONS OF TUMOR.

which was healing by first intention. There is a slightly elevated, semi-fluctuating tumor at the point of operation, pressure upon which causes disintegrated brain tissue to issue from the drainage tube at the bottom of the wound. There is an incised wound, nine and a half inches long, closed by sutures, beginning one inch in front and one inch above the left auricle, and passing upward and backward in a

curved direction to within one and three-fourths inches of the sagittal suture, and thence downward to its point of termination four inches behind the auricle. At the anterior superior angle of the wound a button of bone is found adherent to the dura mater. Three other buttons are found lying upon the dura, non-adherent. Upon the re-

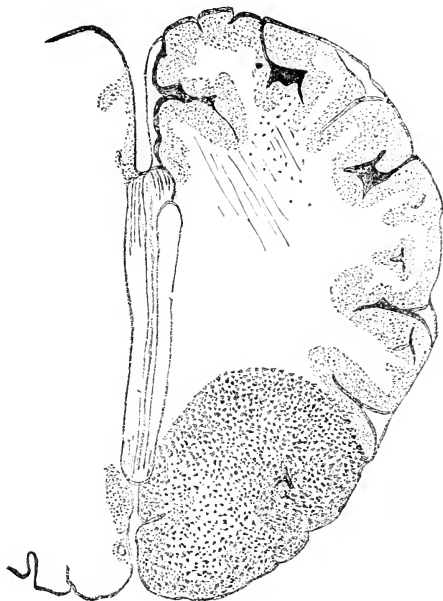


FIG. 4.—HORIZONTAL SECTION OF BRAIN AT LEVEL OF CORPUS CALLOSUM, SHOWING DEEP RELATIONS OF TUMOR.

moval of the calvarium, the dura mater appears normal except for a moderate venous congestion. In the left occipito-temporal region, about two and a half inches from the median line, is an opening in the dura, two and three-fourths by three inches, partially covered by two flaps of dura mater. In the interval between these flaps there protrudes a considerable mass of softened brain tissue. The weight

of the brain is 1570 gms. not including that lost during the operation. There is a moderate congestion of the dura mater on the right side. The convolutions over the anterior half of the left hemisphere are greatly flattened and this portion of the brain is occupied by a non-encapsulated translucent mass, the outer portion of which is somewhat denser than the surrounding brain tissue, but its centre is softened and partially broken down. In the occipital lobe is a large, softened and disintegrated area beneath the site of operation. The subarachnoid space at the base contains a fresh clot which extends up into the Sylvian fissure on the left side, the pia mater of which region presents considerable diffuse ecchymosis. The antero-posterior diameter of

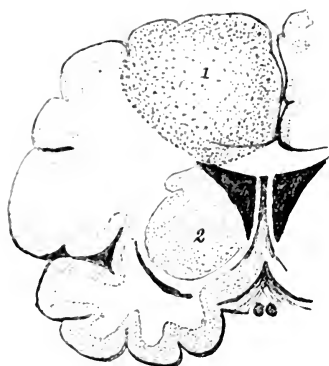


FIG. 5.—TRANSVERSE SECTION OF BRAIN, SHOWING RELATIONS OF TUMOR TO THE LATERAL VENTRICLE AND CAUDATE NUCLEUS.

1. Tumor.
2. Caudate Nucleus.

the left hemisphere is $8\frac{3}{4}$ inches. Of the right $8\frac{1}{4}$ inches. The width of the left hemisphere is at widest part, $3\frac{1}{4}$ inches. Of right hemisphere 2 inches. The following surface measurements were made on the fresh brain: 1st. Distance of the posterior border of the tumor from intersection of fissure of Rolando with mesial surface, along line of junction of mesial and lateral surfaces, is $1\frac{3}{4}$ inches. 2d. One inch from central fissure and parallel to above line, 3 inches. 3d. From a point on the fissure of Rolando $2\frac{1}{2}$ inches from its superior ex-

tremity, $2\frac{1}{4}$ inches. 4th. From the junction of the two arms on the Sylvian fissure, 4 inches. (See diagrams, Figs. 3, 4 and 5). The third frontal convolution, (left), which abuts against the fissure of the island of Reil is softened. The roof of the left lateral ventricle is wider at its anterior half than that of the other side and is bulged inward over the base of the tumor, which extends to within one-half inch of the ependyma. The caudate nucleus is flattened on the left side, *i. e.*, $\frac{1}{8}$ inch from the roof of the ventricle to the internal capsule. On the right side $\frac{1}{4}$ inch.

Microscopical Examination.—The softer portion of the tumor composing about two-thirds of its bulk is made up of nucleated branching cells, closely packed together with but scanty connective tissue stroma. Many of the cells freshly teased, have from ten to twenty or more prolongations, often of very considerable length. The tumor seems to be poorly supplied with blood vessels; the denser portion is made up of brain tissue infiltrated with these spider cells. This infiltration of the brain tissue with tumor cells involves a considerable area, but the infiltration is probably not sufficiently dense to entirely abolish the functions of the parts involved. The nature of the growth is therefore gliomatous. Sections made from that portion of the brain removed at the operation show laceration and bloody infiltration, but no structural lesions. Sections from the necrotic portion removed post-mortem, show superficial softening consisting of fatty and granular changes in the cells and a deeper infiltration of the tissue with blood cells. The vessels of the pia mater are distended with blood and here and there are extravasations of blood in the meshes of the pia. The first temporal and third frontal convolutions show no lesions. The caudate nucleus of the left side, although somewhat flattened has essentially the same appearance as the right. The pineal gland contains a considerable number of corpora amylacea.

REMARKS.—Attention cannot fail to be first arrested by the extent to which the site of external injury proved to have been misleading as a guide to the location of the cerebral disease. That there existed a connection between the production of the tumor and the injury to which it was consequent is, however, not at all the less probable, for no fact is better established than the possibility, even frequency, of lacerations of brain tissue being produced by cerebral commotion resulting from blows upon the head at a point distant from the place of brain injury.

The degenerative cerebral changes, although in the frontal lobes, probably had as their exciting cause the blow at the back of the head sustained in the fall from the carriage in 1884. The possibility of such a distant lesion was clearly present in my mind previous to the operation, and was discounted by me beforehand in whatever expectations were indulged as to the probable success of the operative attack, but I, nevertheless, deemed myself justified in making the effort I did as long as there remained even a strong probability that the site of the external injury was the index to the location of the internal disease. In this determination I was strengthened by the opinion of the consulting neurologists that the localizing symptoms, though too indefinite to warrant them in distinctly localizing the disease, still did not contra-indicate its presence in that region of the brain. I was still further encouraged to give the benefit of the doubt to the region under the scar by the remarkable case reported by Keen (*Am. Jour. Med. Sci.*, Oct. '88, 329), in which an opening made through the cranial vault at the site of a small external scar in the scalp only, which was believed to mark the site where a blow had been received many years before, brought him directly down upon a large fibroma, adherent to the dura, but easily enucleated from the brain tissue in which it was imbedded.

A second point worthy of remark is that the tumor, even if it had been exposed, was not susceptible of complete removal. There is but little clinical experience yet as to the behavior of gliomatous tumors after their partial removal. The Bennett-Godlee case (1884) was a glioma (*Lancet*, 1884, II. p. 1090, 1885, I. p. 13). It was small (walnut-sized), and, being hard, was easily enucleated. The autopsy, which followed the death of the patient from septic meningitis on the twenty-eighth day, showed that all the disease had been removed. In the Hirschfelder-Morse case (1886) (*Pacific Med. and Surg. Jour.*, April, 1886, p. 210) an infiltrating glioma, similar to my own, was encountered; a part only was excised. Death on the seventh day from encephalitis (septic evidently) closes the record of the case. There is a fair opportunity to differ with Dr. Hirschfelder's opinion that the unfavorable result in his

case must be ascribed to the character of the tumor, and that if the case had been one of a hard tumor that could have been easily isolated, a greater probability would have been presented of the patient's recovery from the operation. On the contrary, there is no reason to believe that the danger of septic infection would have been any less in the latter than in the former case.

In the Suckling case (1887) (*Lancet*, Oct. 1, 1887) an infiltrating glioma of the cerebellum was found on autopsy. Part of the cerebellar substance had been cut away in the operative procedures, but it does not appear that the tumor was reached by the surgeon's knife. The patient lived but forty-eight hours after the operation.

In one of Horsley's cases (1886) (*Brit. Med. Journ.*, April 23, 1887) a firm glioma weighing $4\frac{1}{2}$ ounces was removed along with a surrounding zone of brain tissue. Good recovery ensued, with relief to the symptoms for $2\frac{1}{2}$ months, when rapid return of the growth took place with death at the end of 6 months from time of operation. It is altogether probable that in this case the removal of the gliomatous degeneration was not complete, but that the zone of the infiltration extended beyond the parts removed by the surgeon, and by the development of this residue the future symptoms and the final lethal termination were produced.

There is no reason to suppose that the partial removal of a gliomatous mass would entail any danger greater than would inhere in its complete removal, or in the complete removal of a circumscribed growth.

Its rapid recurrence is probable, and temporary relief by the removal of the pressure symptoms caused by its original bulk is the only advantage to be looked for from any attack upon it which falls short of the removal of every portion of brain tissue that is infiltrated with its peculiar elements.

The failure to accurately localize the growth in the case now reported, while it is to be deplored, has, nevertheless, its valuable lessons, and every case of the kind, if minutely studied and faithfully reported, will be helpful in preventing similar errors in the future. The indefiniteness of the symptoms

which have thus far been identified as produced by lesions of much of the frontal and occipital lobes is such that thus far these fields remain in a nebulous state, as far as any reliable indications are concerned which may direct surgeons in attacks upon them. In illustration see the case of Bennett-Gould, 1886 (*Brit. Med. Journ.*, 1887, I, 12), in which, in the case of a man of 36 years, the lesion was located in the angular gyrus, and trephining was done at the site of a cicatrix from an old injury, $3\frac{1}{4}$ inches from the median line and $2\frac{1}{4}$ inches back of the meatus, a point approximating very closely that chosen in my case, in which the measurements were respectively $2\frac{1}{4}$ inches and $2\frac{1}{4}$ inches. Nothing abnormal was found here, however, neither superficially nor upon deep exploration. The patient made an uninterrupted recovery, and, strange to say, for five months after the operation, when the case was reported, had not had a fit.

It might be said in passing, however, that symptoms recognized as sufficient to localize lesions in the special motor centres about the fissure of Rolando have already in repeated instances been found misleading. As for example, the case reported by Birdsall and Weir in 1887 (*Med. News*, March 5, 1888, p. 273) where the tumor was supposed to be at the upper portion of the Rolandic fissure; a large opening through the cranium and dura was made at this point, through which the brain at once bulged, but exploration revealed nothing. The protruding portion of brain was sliced off and the wound closed. The patient lived two months and a half, and on autopsy a sarcomatous tumor was found springing from the left lobe of the cerebellum and extending down into the spinal canal crowding upon the medulla. Also one of Horsley's cases (1886) in which a diagnosis of a lesion of the left motor cortex having been made, the child was trephined, the brain incised for exploration, but nothing was found. The patient recovered from the operation without drawback, and was improved in his general health afterward, (*Brit. Med. Jour.*, April 23, 1887.) Also the case reported by Drummond (1887) in which the facial centre was diagnosticated as the subject of lesion. An opening was accordingly made here, but nothing abnormal

was discovered. The patient survived but a few days, and the autopsy revealed an abscess in the posterior part of the frontal convolution, (*Lancet*, Oct., 1887, p. 656.)

The most recent case reported by Keen (*Med. News*, Dec. 1, 1888) illustrates again the uncertainties which may attend operative attacks on the brain. This experienced and careful surgeon and neurologist made a positive diagnosis of abscess of the temporo-sphenoidal lobe, and for very good reasons excluded meningitis, in a child under his care. He accordingly trephined over the spot localized; healthy brain bulged into the opening; multiple exploratory punctures with hypodermic needle and a grooved director were negative in their results. The child died on the fourth day after the operation, and the autopsy revealed a healthy brain, but with ventricles distended with serum the product of a tubercular meningitis!

Weir, in a recent paper (*Amer. Jour. Med. Sci.*, Sept. 1888, 227) calls attention to the difficulties which beset the question of accurate localization of intracranial lesions, and refers to three cases in addition to his own, referred to above, which have recently occurred in the experience of New York surgeons, in which the cranial wall has been perforated without finding any disease. With the impetus which has lately been given to the subject of brain surgery by Macewen and Horsley in Great Britain, and by the recent discussions at the American Congress of Physicians and Surgeons in this country, it is certain that operative efforts for reaching and relieving intracranial lesions will rapidly multiply and it is as certain that a considerable proportion of failures will be met with. Probably for a time the proportion of failures to successes will be greater than they have been thus far.

Out of this experience, failures quite as much as successes, is to be gathered knowledge which will be of great value in making our future work in this field more certain.

The operative technique involved in attempts to remove tumors of the brain has been very thoroughly gone over by Horsley, Weir, Keen and Park, and my own operation was conducted on the lines laid down by them. That the asepsis was complete was shown by the results of the autopsy which

revealed primary union over a considerable extent of the wound, with no pus in any part of the operated field, even when subjected to rigid microscopical search. An attempt to control the expected profuse hæmorrhage from the extensive primary scalp incision by encircling the head by two or three turns of an elastic bandage horizontally below the line of the incision was a complete failure. The rapidly made incision was followed by abundant bleeding from many parts, which, however, was quickly and satisfactorily controlled by the pressure forceps, and the mass ligatures, applied as shown in the cut. Another time I should waste no time with the elastic bandage. In trephining I had two instruments, a larger 1 inch diameter trephine of the old crown pattern, and a smaller $\frac{3}{4}$ inch conical one. They both functioned well, but the rapidity and ease with which the latter instrument cuts its way through the bone was much greater than that of the former. For this reason, entirely apart from the greater security against undesired injury to the underlying tissues, I should prefer conical instruments for future use.

Hæmorrhage from the vessels of the dura was entirely prevented by passing a curved needle armed with catgut under them and tying them on the proximal side of the incision before dividing them. In the latter stages of the operation one or two arterioles of the pia, that were severed when the protruding brain mass was sliced off, gave me annoyance from the difficulty of applying ligatures to them. This was due not only to the delicacy and fragility of the tissue, but also to the fact that by that time the prolonged labor of the operation had rendered the hands of the operator less steady than they would have been earlier in the operation. Morphia had been given before the operation, and an 8% solution of cocaine was applied locally for its hæmostatic effect, but neither of these agents could be expected to materially affect vessels of any size. They certainly produced no apparent effect in this case. It will be noticed in the history that extensive explorations were made for the purpose of examining the deeper brain tissues by the use of a fine trocar and sharp needle. In making these explorations as extensive as they were, I relied not upon

my own judgement alone, but also upon the advice of the experienced neurologists who were associated with me in the case. In connection with these punctures, however, we cannot fail to remember that at the autopsy there was found a considerable amount of fresh clotted blood in the subarachnoid space at the base of the brain, and that this clot was traceable upward into the Sylvian fissure and that there was connected with it likewise over a considerable territory more or less submeningeal ecchymosis. There is but little doubt that this hæmorrhage was the result of the puncture of some of the vessels passing up the Sylvian fissure. Dr. Hodenpyl, in conducting the subsequent careful examinations of the brain, injected these vessels but was unable then to find any point through which the blood in fact escaped, but, nevertheless, I think there can be no doubt that the source of this hæmorrhage was the puncture of some of these vessels by the exploring needle. How large a part this subarachnoid hæmorrhage played in producing the final symptoms which terminated in death may be a subject of question, but it is my conviction that it played a considerable part in it, and that the final œdema of the lungs and the respiratory failure may fairly be referred to the pressure of this subarachnoid clot. The case illustrates the danger of the use of a sharp instrument in making these deep explorations.

Attention has already been called to these possible dangers in the writings of others.

Weir, in his remarks upon the subject, speaks of the possible dangers connected with the use of a fine needle, and says that he knows of two fatal results that are referable to such explorations.

Keen, likewise, speaks of possible evil results, although in one of his cases, his last case, he did not hesitate to thrust in an hypodermic needle quite freely when he believed there was an abscess.

In a recent case published by Dr. Deaver, of Philadelphia, in an attempt to remove a supposed tumor of the spinal cord, a fatal result was produced, and in his remarks upon the case the doctor attributes the fatal result to wounding of the phrenic

centre by an exploring needle which was used. These cases sufficiently demonstrate the danger of a sharp exploring needle, and in another case I should confine myself entirely to the use either of an ordinary fine probe or a grooved director, not too large.

A last point—the behavior of the buttons of bone after being replaced. It will be noted as a matter of considerable interest that one of these buttons of bone, at the end of thirty-eight hours had become quite firmly adherent to the dura upon which it was placed. This illustrates the possibilities of replacement of large masses of bone, particularly about the cranial vault and their becoming adherent and retaining life and becoming again incorporated into the cranial substance, and is an excellent illustration of the teachings which we owe primarily to Macewen, and which have been taken up so zealously by Keen, of Philadelphia. It is true that others who have attempted the practice have reported failures in securing the revivification of these bone buttons. The fact, however, that in some cases failures take place, does not militate against the desirability of making the attempt. If the bone button is preserved sterile and is replaced, if vascular connections fail to be established, it remains simply as an inert mass which at a later time may be removed; meanwhile the possibility of its forming new connections has been taken advantage of; if, on the other hand, it should have become adherent, and the life of the patient should be prolonged, it would certainly be to his advantage. It seems to me, therefore, that we may soon look upon the attempt to re-implant these bits of bone as a recognized tenet of surgery in connection with attacks upon the cranial vault.

ON THE TRANSPLANTATION OF LARGE STRIPS
OF SKIN FOR COVERING EXTENSIVE GRAN-
ULATING SURFACES, WITH REPORT OF A
CASE IN WHICH HUMAN AND FROG
SKIN WERE SIMULTANEOUSLY
USED FOR THIS PURPOSE.¹

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CASE :—R. W. æt. 16 years, single, American, colored. Admitted to Methodist Episcopal Hospital, April 10, 1888, two weeks following a burn, the result of the accidental upsetting of a kerosene lamp. Prior to admission the burns had been treated with carbolized oil. On admission, temperature 102° Fahr. Pulse 120. Suppurating surface involving the thickness of the true skin, for the most part, extending from level of crest of ilium downward over both buttocks. That upon the left side reaches to the knee-joint, while upon the right side the middle of the thigh is reached. Laterally the burn extends to the right as far as a line drawn downward from the middle of the crest of the ilium, and on the left as far downward as the anterior superior spine. The greatest length of the burn upon the left side is $17\frac{3}{4}$ inches, and the greatest width 11 inches, with an average length of $14\frac{1}{2}$ inches, and width of $7\frac{3}{8}$ inches. The maximum measurements of the right side are 15 inches in length and $9\frac{3}{4}$ inches in width; average length $10\frac{1}{2}$ inches, and width $6\frac{3}{4}$ inches. Upon the back and anterior surfaces of the thighs there are also a number of smaller burned areas. A raw surface five inches broad extends entirely around the right ankle; on the posterior surface of the left ankle is a burned area five inches long and four inches wide. Estimated total area of burned surface, 247.95 square inches.

May 10. Since admission but little progress has been made

¹Read before the Brooklyn Surgical Society, Nov. 1, 1888.

toward cicatrization. The treatment has consisted of antiseptic irrigation and dressings of liquid tar and ointment of oxide of zinc. Discharge from granulations very profuse. Temperature varying from 101° to 103° F. Patient's strength much reduced since admission. Skin transplantation resolved upon, and so preliminary to this, the surfaces were thoroughly cleansed and dressings of a solution of potassio-mercuric iodide, 1-12000, ordered.

May 15 Operation of skin transplantation. Potassio-mercuric iodide solution washed from surfaces with sterilized salt solution, 6 1000. Instruments and sponges were immersed in this solution. The skin from the back and abdomen of a live frog was then transferred to the granulations over the left buttock. On the right buttock eight strips of white human skin were placed, after the manner of Thiersch. Strapping with oil-silk and gauze compresses wet with the salt solution constituted the dressings. Temperature at time of operation 101.4° Fahr.

May 17. Since the operation the temperature has fallen to 99° Fahr. The strips of frog skin are all in place, firmly attached and exceedingly sensitive. Most of the strips of human skin are likewise in place and of good color; one or two of the latter have been displaced by the movements of the patient.

May 19. The entire skin of three frogs was transferred to the left buttock. The following notes refer to the changes taking place in the transplanted frog's skin.

Second day. Slight slimy discharge, but no change in the color of the transplanted strips.

Third day. A very thin layer came from the surface as the dressings were removed. The color has faded very slightly.

Fifth day. Strips much thinner and color disappearing. The outlying edges of the burned surface show an increased activity, as do also those of a few previously formed centres of cicatrization scattered about the surface and lying adjacent to the transplanted skin.

Tenth day. The color of the grafts has disappeared, and there appears to be left a thin layer of epithelium, covering the surface. To-day a strip of human skin was placed upon the surface of the frog's skin.

June 2. Four days following the placing of the strip of human skin upon the transplanted frog's skin, the former was found to be for the most part necrotic. The areas covered by both frog and human skin are entirely healed. Cicatrization is going on rapidly at the ankles. Patient improved markedly in appetite and strength.

June 30. The transplanted human skin has made a very firm integumentary covering. Where the frog skin was placed, a very deli-

cate and soft surface, fully healed, exists. A small portion of the human skin placed over the frog's skin is found to have retained its vitality. Patient allowed to sit up.

Sept. 1. On the left buttock (site of frog's skin transplantation) two points have broken down, evidently the result of pressure. These show a marked tendency to bleed.

Oct. 1. The broken-down points show no tendency to heal, although patient is again kept in bed with dressing of subnitrate of bismuth. The skin over the right buttock (site of human skin transplantation) is firm and healthy. That over the left is much firmer than when last noted, and is of a reddish hue. A darker color marks the site of the centres of cicatrization which had existed prior to the skin transplantation.

Oct. 18. Firm strips of white skin from arm of the patient were placed over the points where the frog's skin had broken down.

Oct. 25. The last transplanted skin strips have become partially attached. Small portions of two of them have broken down.

Nov. 10. Discharged cured. The frog skin is soft and pliable, and of a reddish hue. The white human skin is firm, and of a darker color than the above, but much lighter than the rest of the patient's body. The portion of skin transplanted from the patient's arm is nearly as dark as the natural color of the patient. The color of the small patches, the result of cicatrization is decidedly that of the negro, as is also that of the cicatrized surfaces about the ankles. There is not the slightest tendency to contraction of the surfaces of repair.

There is no class of deformities more distressing to the patient, or which cause greater annoyance to the practitioner than those the result of cicatricial contraction following burns, or other destructive lesions of the skin in which the deficiency of tissue is made up by the slow, tedious and uncertain process of cicatrization. Here, above all things, is the ounce of prevention worth a pound of cure, and it is in this class of cases that skin transplantation is particularly applicable.

In the case herewith reported, both the method known as Thiersch's¹, and that of transplantation of frog's skin introduced by Baratoux and Dubousquet², were resorted to simul-

¹Archiv. für klinisch. Chirurg. Bd. XVII, 1874.

²Progres Med., No. 15, 1887.

taneously. As will be seen by the notes of the case and its final result, both methods were found to fulfill the requirements, although the subsequent breaking down of a portion of the area covered by the frog's skin suggests the greater stability of transplanted human skin, as compared with that derived from other sources.

Both Thiersch's method and probably that of frog's skin transplantation are applicable to fresh aseptic wounds, and will find application where defects of area are the result of extensive dissection for the eradication of malignant growths in localities where sliding of tissue for the purpose of filling in the gaping wound is not practicable, or, on account of the resulting distortion, undesirable, as for instance, upon the face. After the division of webbed fingers, considerable difficulty is experienced in preventing the granulations from springing up in and obliterating the interdigital angle. This may be obviated by a skin transplantation. The preparation of a fresh wound, when it is in other respects in good condition for primary healing, is completed with the arrest of hemorrhage. Any antiseptic used previously should be washed away with a 6-1000 sterilized salt solution, and a compress wetted with the same is laid firmly over the wound surface, while the skin to be transplanted is being prepared.

In those ulcerated surfaces, characterized by indolent flabby granulations with occasional tufts rising above the general level, and perhaps here and there an island of epidermis, with blue, unhealthy looking edges, it is best to thoroughly curette the entire ulcerated area with the sharp spoon, including in this the thickened fibrous tissue of the edges; even though in the latter an attempt at the formation of an epithelial covering may have been made. Irrigation with a 1-12000 potassio-mercuric iodide solution, and subsequent rinsing with the salt solution is followed by the application of the salt water compresses until such time as the bleeding is arrested. A slight oozing of blood is not a bar to success.

The same method should be employed in cases where, from prolonged attempts at repair, a base or floor of fibrous tissue exists, upon which no granulating tissue develops, owing to

the failure of the vessels to reach its surface. In case the fibrous floor is of considerable thickness, parallel incisions made through the same, about one-eighth of an inch apart, and through its entire thickness, will seem to permit the vessels to furnish the needful nourishment to the over-lying structures from beneath.

Although transplantation may be at once practiced following the curetting in the above class of cases, yet the prospects of success are very much enhanced by allowing granulations to spring up, and applying in the meanwhile antiseptic compresses.

It is of the greatest importance that advantage be taken of the proper stage of the granulating process. In cases characterized by the existence of fresh granulations, with loose structure and profuse secretions, adhesion of the transplanted strip is very much less likely to occur, and frequent failure will occur. Septic conditions are likewise frequent causes of failure. The best results are obtained when the growth of the granulations and the secretions have been markedly restricted and diminished by repeated cauterization, and the use of astringents and compression.

The granulating surface being in proper condition, the most important part of the procedure itself relates naturally to the proper cleansing and disinfection of the part where the defect is to be supplied with new skin, and the surroundings thereof. Great care should be exercised in the selection of an antiseptic, which, while possessing the advantages of potency, shall at the same time be capable of application in such a state of dilution as not to produce poisonous symptoms, even though it be continued in contact with large ulcerating surfaces for several days. For, in order to insure strict asepsis, a disinfectant should be kept in contact with the ulcerated portion for at least two days, and, in some instances, when the early treatment of the burn has been neglected, and the surrounding tissues have become more or less infiltrated, a longer time must be occupied with this stage of the operation. For the purposes of this preliminary disinfection, nothing could meet the requirements more fully, in my judgment, than a 1-12000 solution of the potassio-mercuric iodide. The surrounding

parts having been thoroughly scrubbed with a soft brush and a strongly alkaline soap (common kitchen or laundry soap answers best), the parts are rinsed with a stream of warm water, either distilled, or previously boiled, and squares of gauze of several thicknesses, wrung out of the before-mentioned potassium-mercuric iodide solution, are placed in such a manner as to cover the surface of ulceration and overlap its edges for an inch or more.

Whatever antiseptic is used in the preparation of the ulcerated surfaces, care must be taken previously to the application of the new skin to wash away every vestige of the same. The influence of these more powerful antiseptics is such as to interrupt the changes which occur in the vessels as well as in the blood itself during the first few hours of contact between the transplanted skin and the point of defect. A solution of common salt, in distilled or sterilized water should be used for this purpose. In Thiersch's first trials many failures were attributed to a lack of this precaution. The salt solution was finally chosen from the belief in its tendency to limit free exudation from the ulcerated surface, which would be most threatening to the integrity of the graft, as well as its slight influence upon the blood corpuscles.

The question of the administration of an anæsthetic to the donor is an important one, and must be considered in connection with the particular idiosyncrasy of each individual. Where a number of individuals volunteer to furnish the skin for transplantation, and but a single strip is taken from each, it will be obviously impracticable to administer an anæsthetic to each donor. On the other hand, but few will be found to volunteer to give a large amount of skin, and endure the inconveniences and risks of an anæsthetic, in addition; nor yet to allow themselves to be flayed alive, with all that the term implies. Where the skin is taken from the patient's own person, and, with the exception of cases of very young children with comparatively large surfaces of defect, this is the most satisfactory method, the surgeon must judge as to the necessity for an anæsthetic. There is really but slight pain attending the removal of the skin, and it is best to avoid, if possible, any chance of failure from the presence of even an infinitesimal

portion of ether or chloroform in the blood or tissues. Those from whom I have removed skin for purposes of transplantation, after Thiersch's method, speak of the operation as being only accompanied by a peculiar burning sensation.

The application of an Esmarch's bandage prior to the removal of the skin for transplantation is not advised, save for persons in whom it may be absolutely necessary to save even the few drops of blood lost during the operation. There is some risk to the vitality of the transplanted skin in its use, and wherever possible it should be avoided. Certainly the conveniences to the operator derived from its use are more than counterbalanced by the danger above alluded to.

The arm or thigh from which the strip of skin is to be removed is to be carefully shaved, if it be in a situation in which hair grows, and is to be submitted to a careful process of scrubbing and disinfecting with the 1-12000 potassio-mercuric iodide solution. This in its turn, is to be rinsed away with the sterilized 6-1000 salt solution. There does not seem to be any disadvantage arising from the congested condition of the skin arising from this process of scrubbing; on the contrary, I have looked upon this rather as having a beneficial effect than otherwise.

The best instrument for the removal of the skin to be transplanted is the section razor, used by microscopists, or a common razor with a smooth, concave surface, and a very keen edge. If the part to be operated upon be an arm, or a slender thigh, it should be grasped by the operator's left hand in such a manner that the palmar surface of the latter rests upon the posterior aspect of the former, and the thumb and fingers secure a firm hold by partially encircling the limb. By this manœuvre the skin is drawn tense and prevented from sliding ahead of the razor, or moving from side to side. The blade is to be laid flatwise upon the surface, and, by a sawing motion, commencing at the heel of the blade, the skin is shaved off, the resulting strip, or more properly speaking, shaving resting upon the razor blade, as we proceed. It is best to commence the cut high up and work toward one's self, for in this way a greater steadiness of the hand can be preserved and a strip of uniform thickness throughout its whole length secured. Of

course the strip will vary in thickness in a transverse direction, according to the width of the part operated upon, the depth at which the razor blade is allowed to reach, and the desire of the operator to secure a wide or narrow strip. It is best not to attempt to obtain too much at one cut, for the reason that, although the edges of the strip will always be thin enough, the central portion will be necessarily thicker, and may involve the adipose tissue, a most undesirable addition to the transplanted portion, and an unnecessary infliction of traumatism. At the same time it must be borne in mind that this is not a transplantation of the papillæ alone. The claim that this is all that is necessary to transplant is probably an error. In fact, it is not at all desirable to use slices or slips containing papillæ alone, even if this were possible. According to Thiersch, everything depends upon leading the vessels into the superimposed transplanted skin in the shortest space of time possible. This is very much facilitated by the use of skin of a thickness sufficient to secure the presence of the stroma containing the horizontally lying net-work of vessels. If the blood finds entrance at a point or two of the latter, the vertical vessels are soon supplied from these; but if papillæ alone are used, each of the latter must be supplied directly. So long, therefore, as the subcutaneous cellular tissue space is not invaded, and fat left attached to the strip, the thicker the overlying portion, the more complete the result.

As the strip or sliced-off portion of skin gathers itself upon the surface of the blade, it wrinkles somewhat, and when it is found that so much as will conveniently remain upon the blade without falling off has been obtained, it is best to terminate the cut by turning the edge of the blade away from the surface. The strip is now to be transferred, still lying upon the surface of the razor blade, directly to the place where it is to be engrafted, and there slid off and laid smoothly upon the surface intended for its reception. This manœuvre is best executed by the aid of a pair of dressing forceps, care being taken not to bruise or injure in any way the transplanted skin by injudicious pinching or stretching of the same. Should it adhere to the blade, or become wrinkled or folded upon itself, it may be floated off from the razor by immersing the latter in

a convenient vessel containing the sterilized salt solution, and then spread out, preparatory to transfer, upon the end of the surgeon's disinfected finger.

As each strip is laid in place, it is lightly pressed upon in order to force out any blood from between the parts, as well as to favor its immediate adhesion. The strips should be laid side by side, slightly overlapping each other, or at least as closely together as possible, and such as are adjacent to the edges should project slightly beyond the latter. In this way the entire area of defective surface is to be covered. Where the latter is of such an irregular shape as to necessarily leave intermediate spaces, the granulations will fill in the gap. But when adjoining strips touch or overlap each other, and these are of uniform thickness, the line of junction, after a time, can be scarcely discovered.

The method of dressing is of the greatest importance. Thiersch recommends gauze compresses wrung out of the salt solution and changed daily, the surface being gently irrigated with the warm sterilized salt solution each time. In order to prevent the compresses from clinging to the transplanted pieces and loosening the latter upon removal, it is advisable to first lay strips of sterilized protective or oil silk dipped in the salt solution and arranged as in basket-strapping, over the surface. The compresses of gauze should be sufficient in size to more than cover in the area of the wound surface. Over this is placed a large and thick dry compress, and, when the situation will allow of it, the whole is to be held in place by means of a gauze roller bandage. In case the site of the transplantation is in the neighborhood of a joint, or when from any other reason, especial care must be taken to prevent slipping or sliding of the dressings, and particularly in the case of young children, enveloping the parts in a starch or dextrine bandage, or the application of a splint, or both, will be found to more certainly insure a favorable result. In any event, care must be taken not to apply the bandage too tightly, and, in the case of the extremities, it must not retard the circulation.

In changing the dressings, which should be done daily, each layer must be carefully loosened, after being first gently irrigated and thoroughly soaked with the warm salt solution.

Upon raising the strips of protective or oil silk, the transplanted pieces will be found to be quite adherent, in some instances of a rosy hue, or a pale, yet not necrotic appearance. But little, if any exudation will have occurred, and if the granulating surface has been well covered in, scarcely any pus will be found. A gentle stream of the salt solution is allowed to trickle over the parts, and the dressing applied as before. After the first week, slight dusting with iodoform or subiodide of bismuth and a dry compress are to be substituted for the wet dressings. If a transplanted strip actually loosens and falls off a failure at that point does not necessarily result, for an island of epithelium is frequently found, and a good result follows. A bluish color indicates a collection of blood beneath the strip, which sometimes endangers its vitality, but does not always prevent its final adhesion. If, after a few applications of the dry compresses septic appearances occur, the salt water bandages must be again resorted to. After a week, the new formation tissue between the transplanted skin and the underlying surface is sufficiently advanced to resist the action of bacteria.

If the wound surface is not entirely covered, it frequently happens that an increase of secretion from the intermediate granulating surface occurs, which burrows its way under the edges of the adjoining transplanted strips, and prevents their adhesion. The outer layer of its epidermis forms blebs, which become filled with sero-pus, and this flows over the adjoining strips. This may happen to strips which have every appearance of being firmly adherent, and result in their being crowded away or becoming necrotic in situ.

It sometimes happens that the transplanted skin is broken through by the underlying granulations, and apparently the transplanted surface, in spots here and there, has broken down and is ulcerating. The portions of skin thus involved may disappear temporarily, to again make their appearance as the granulations recede. These so-called exuberant granulations may be the result of infection, but are far more likely to occur in cases where the transplantation is done in a stage of the granulating process too early for the reception of the trans-

planted skin, and in which there is still a very intense tissue-forming activity of the surface.

In those cases in which attempts are made to repair defects in the soft parts following necrotomy, disinfection of the parts is very difficult, and a large percentage of failures follow these attempts. In all cases of persistent failure in ordinary cases, the latter is probably due to infection, and measures to correct this are indicated. In cases suspected of a syphilitic taint the exhibition of iodides or a course of mercurial inunction will assist in clearing up the diagnosis. In fact, syphilis, and the presence of pus micrococci are the main obstacles to success. As just stated the former can be eliminated, while the presence of the latter is due to insufficient preliminary disinfection. Even exposed glandular and muscular tissue have been successfully covered. Attempts to remedy defects in location when tendons are lying uncovered, or spongy bone substance, are very uncertain in their results; the attempts to successfully cover bare compact bone, is quite likely to prove futile.

Within the first few weeks after a successful skin transplantation the parts may present a peculiar mosaic appearance. This may be due to some extent to the fact that the pieces are thicker at the central portions than upon the edges. Insufficient covering of the surface of defect will also be responsible for this to a great extent. This, however, gradually disappears, and in any event is of but slight consequence, except in exposed situations, as for instance, the face.

The treatment of the point from which the skin has been removed will consist in simply dusting over the same with subiodide of bismuth or iodoform, dressing with a compress or sterilized gauze, and the application of a roller bandage. In the course of a week or ten days, the healing process is completed and that, too, without cicatrization. Successive portions of skin can be taken from the same point and successfully transplanted.

In transplantation of frog's skin, the same precautions should be observed in the preparation of the surface to be covered, and in its thorough disinfection and subsequent freeing from all traces of the germicide used. The frog to be used for the pur-

pose should be a healthy animal and as large as can be obtained. It is of advantage to keep it for several days in a vessel containing clean water, which should be changed from time to time. Just prior to the operation it is placed in the salt solution. Two shallow vessels containing the warm salt solution are in readiness and the instruments, after disinfection in hot water, are to be placed in one of these; the other is for the reception of the strips of skin as they are removed from the frog. A pair of dissecting forceps and scissors are the best instruments for removing the skin from the frog. The animal is held by an assistant by grasping its extremities and head, while the operator, pinching up a fold of skin, snips it through transversely to the long axis of the frog's body, and just behind its eyes, for from a quarter to half an inch, according to the size of the frog. This gives the width of the strip to be removed; the length will be governed by the steadiness with which the animal is held by the assistant. The skin of the frog is very loose, and readily strips away from the subjacent parts. The entire integumentary surface is to be removed in strips, including that of the fore legs, back, abdominal surface and lower extremities. As each strip is removed it is at once transferred to the warm salt solution, and, placed in situ upon the area of defect to be supplied as soon thereafter as possible, this being done, where practicable, by a third assistant. The same rule should apply here as in the operation for transplantation of human skin, *i. e.*, to cover the surface as completely as practicable and to leave as few and as narrow spaces between the strips of transplanted skin as possible.

Precisely the same methods of dressing and after treatment are employed as in case of transplantation of human skin. The daily dressing must be conducted with great care under a warm stream of the sterilized salt solution, in order to avoid disturbing the newly transplanted skin.

The first change noticeable in the transplanted frog's skin is the loss of its pigment. This takes place in from 7 to 10 days, and is most complete. The strips became perfectly diaphanous, and resemble wet tissue paper, the bright red granulating surface beneath showing through with great distinctness. The deeper shades of pigment are the last to disappear, and even

after 10 days, a tortuous streak of the same may be seen here and there. Gradually the strips assume the natural color of the skin of the white; in the colored individual the transplanted frog's skin, like the transplanted human skin, is not invaded by the pigment. In our present patient's case, this is noticeable. In the intermediate spaces where her own granulating tissue sprang up between the transplanted pieces both frog and human, the natural pigment staining is observed. Upon the left buttock, where the strip of skin taken from her own arm was placed, it will be noticed that the latter has maintained its pigmented aspect.

The most noticeable fact connected with the covering in of this large suppurating and granulating surface is the prompt and decided fall of temperature which ensued. Septic absorption ceased as soon as the natural vital resistance of the tissues was reinforced, and the granulations were perfectly protected from atmospheric influences.

TRACHEOTOMY IN A CASE OF CERVICO-DORSAL SPINAL ABSCESS PRODUCING PRESSURE UPON THE TRACHEA AND OESOPHAGUS. SUBSEQUENT DEATH FROM ULCERATION OF THE TUBE THROUGH THE TRACHEA INTO THE INNOMINATE ARTERY.

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FORWARD REGION TO THE OUT-PATIENT DEPARTMENT OF THE GLASGOW WESTERN INFIRMARY; SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE GLASGOW SICK CHILDREN'S HOSPITAL.

THE unusual condition which called for tracheotomy in this case, and the unfortunate result which caused the death of the patient, have led me to believe the case one of sufficient interest and instruction to be placed on record.

Abstract of report in ward journal taken by the House Surgeon, MR. JAMES ADAMS, M.A., M.B.

James M., æt. 8 years, was admitted into the Western Infirmary on May 5, 1888.

His family history showed that his mother and one brother died of tubercular disease.

On physical examination of the child, the following conditions showed themselves:

The head is seen to be thrown forward on the chest, the lower jaw resting on the sternum when the child stands, and the shoulders appear shrugged. The vertebral column in the dorsal region is markedly straight, the normal dorsal curve, especially in the upper region, being absent. In the cervical region there is a decided hollow, the spines of the vertebrae being deeply sunk. The length of this region of the column is much reduced so that the occiput comes well down to the dorsal spines. The chest wall projects prominently forward, and

the costal cartilages at their junction with the ribs are enlarged. Neither in the neck nor elsewhere are there any signs of an abscess bulging. The child does not complain of pain anywhere, and pressure on the spines does not cause any discomfort. If, however, the head be pressed slightly from above downward, pain is at once complained of in the back of the neck. Raising or lifting the head causes some amount of disappearance of the deep cervical hollow behind, and does not give rise to pain. The patient can nod the head and rotate it to right or left with considerable freedom and without any apparent inconvenience. In attempting to walk the patient staggers forward a few steps, and, if not supported, would then fall. He has some little difficulty in swallowing both solids and liquids, a disagreeable choking sensation being experienced until the obstruction is passed. His breathing is somewhat labored and coarse râles are heard pretty abundantly about the bases of both lungs. In general appearance the child is pale and emaciated.

For some days after admission the child considerably improved; his bronchitic trouble diminished and his swallowing became easier. On May 23d, however, the report states that yesterday and to-day there has been marked stridulous breathing, accompanied with striking protrusion of the chin, retraction of intercostal spaces and diminished movement of the thoracic walls at each inspiration.

On the evening of the 23d, the patient's respiration had become much worse, there was considerable sucking-in at the intercostal spaces, about the clavicles and below the ribs. There was also much lividity. I discussed at this time the question of tracheotomy, pointing out the difficulties connected with opening the trachea in the extremely limited space allowed by the shortening of the neck and that when the trachea was opened it would still be above the obstruction.

During the night the child became so much worse and a fatal result seemed so imminent that I was sent for; and although the prospects appeared remote of any good results being likely to accrue from operative interference, tracheotomy seemed to offer the only possible chance of saving life. The child was accordingly prepared for the operation; a few whiffs of chloroform were administered and the neck carefully extended to give as much room as possible in front.

After the first incision the child became livid and stopped breathing; without further dissection the trachea was opened, when the patient gave a gasp, sucking in some blood and again ceased to respire. The pulse also stopped. The lips of the wound, as also those of the trachea, were held apart by means of retractors and artificial respiration

commenced. Air, however, did not enter freely and although after a minute or so one or two natural respiratory efforts were made, these were stridulous and showed that material obstruction existed below the trachea wound. I then passed in an ordinary No. 4 steel bougie and pulled or hooked the trachea well forward against the sternum; this was no sooner done than air was found to enter the lung freely and all suffocating symptoms immediately disappeared. Removal of the bougie or any relaxation of the forward pull of the trachea at once caused a reappearance of all the obstructive symptoms. The insertion of an ordinary tracheotomy tube proved useless, as the obstruction, whatever it was, existed below the part to which the tube reached. I therefore took the only thing at hand, an ordinary No. 11 gum elastic catheter, cut off the end and passed this down the trachea for about $2\frac{1}{4}$ inches. It was done without difficulty and fortunately proved perfectly efficient. About two inches of the tube was left projecting beyond the wound and curved so as not to be occluded by the soft parts beneath the chin. No attempt was made to tie the tube in, the patient being carefully watched by the nurse. The wound was covered around the tube by pieces of lint soaked in carbolyzed glycerine and a relay of sponges wrung out of hot water were kept constantly applied to the orifice of the tube. The child remained comatose, with feeble pulse, for several hours after the operation, but then rapidly rallied, both pulse and respiration greatly improving. The journal report then goes on to state: Four or five hours after the operation the tube was taken out as the respiration became slightly embarrassed. It was found to be quite patent, but the child immediately became livid, being unable to breathe. As soon as the tube was reinserted, mucus and clot were forcibly ejected through it and also into the mouth; the breathing then became quite free. Several times since, respiration has become impeded owing to the blocking of the trachea with muco-purulent exudation; but this has always been relieved by coughing and suction through the tube by means of a syringe.

May 27, (three days after operation). The patient has continued very well and to-day seems better than he has ever been since admission. Respiration perfectly tranquil, little cough, little spit and the expectoration is less viscid and much less purulent than it has been since operation. He is able to swallow solids and fluids with ease. Temperature normal. The improvised gum elastic catheter tube was to-day replaced by a specially made vulcanite tube, the length of the vertical part of which was $2\frac{1}{4}$ inches and the bore equal to that of a No. 13 catheter.

The report still further states that on this day a spastic condition of the legs was noticed. The patient could draw up the left leg but could not push it down. The right he could not move. The following morning this condition had largely disappeared but was subsequently noticed to come and go repeatedly. There was also marked exaggeration of both knee reflexes and marked double ankle clonus.

May 30th.—This morning a spastic condition of both hands was first noticed. The nurse states that on the admission of the patient, she noticed that whenever she lifted him, he stiffened out his legs and she had constantly noticed this since, whenever he has been moved.

June 12.—The spastic condition recurred pretty frequently for several days but has been less frequent and less lasting during the past week, although there is still some exaggeration of the reflexes.

June 20.—Patient has continued pretty well except that lately he has refused to bear the vulcanite tube longer than a few hours and prefers the old gum elastic ones. He complains of the former pricking him somewhere about the level of the episternal notch. He has also rather more difficulty in breathing and coughing mucus through them. The gum elastic tubes seem, on being passed, to hitch slightly against, and then to pass by, some obstruction.

Suddenly about 1 A.M. this morning (June 21), while coughing slightly, the child became asphyxiated. The tube was removed, but found quite patent. Another was inserted, but still no return of respiration, which had now ceased. Dr. Adam then resorted to artificial respiration, and after a short time the patient gave a gasp or two and then gradually came round. No mechanical obstruction of any kind could be found to account for the sudden onset of the symptoms.

June 24.—For the last three days properly curved vulcanite tubes have been used with complete success. The curve of the previous tubes appears to have been much too circular. The length of the tube now within the external wound, measured along the concavity of the arch, is $2\frac{1}{2}$ inches.

July 1.—The patient feels quite happy and comfortable, though he never moves from an absolutely supine position. Breathing perfectly easy. He is able to articulate with perfect ease through the tube, himself stopping the external orifice. [The report should have stated that one of these vulcanite tubes had been made so as to admit of air passing by means of an orifice in its upper part through the larynx.] When the tube is removed, he can also phonate by plugging the orifice in the same way. He can bear to have the tube out for a quarter

of an hour, but then begins to get nervous, his breathing gets bad, and he cries to have the tube reinserted.

The patient is not troubled with cough except on removal or introduction of the tube (every twenty-four hours or longer). There is distinct feebleness of grip with left hand; with the right he has hardly any power to grip at all. He can move both arms but prefers to use left for all purposes, as he is uncertain and feeble in the use of his right. He is less troubled with spasms of limbs than formerly, though he still wakes out of sleep crying, with tonic spasms of both upper and lower limbs.

I need not follow in detail the report for the next two months, but take up the account again on Sept. 18. The journal here states :

The child is much stronger in general health, looks better in appearance, is more vigorous in his movements, is much stronger in his arms, and the grip of both hands is more powerful, though the right is still the weaker. Ankle clonus is not nearly so marked as it used to be. Formerly, it was elicited by his simply drawing his legs up in bed (his favorite position). Now, he lies with them stretched comfortably out, and can move them freely, though he does not seem to have perfect power in guiding their movements. Ankle clonus to be elicited requires somewhat firm flexion of the part while the knee is bent. It is obtained in both limbs. An attempt was made to introduce a short tube to-day, but the child got nervous and seemed to have considerable difficulty in expiration, so that it was deemed advisable to replace his own long one. Three weeks ago, however, the patient had been able to breathe quite freely for two hours without any tube and with the wound in the throat closed. To-day it was impossible to keep the tube out longer than half an hour, difficulty both in inspiration and expiration necessitating its reinsertion.

Oct. 4.—Patient is fattening; limbs are much stronger and he can guide both arms quite well. The grip of the right hand is now nearly as strong as that of the left. Ankle clonus is diminishing; though still distinct on the left side it is almost, if not quite, gone on the right. An attempt was made to replace the long phonating vulcanite tube by one quite similar except that it is shorter, but the patient, owing to difficulty both of inspiration and expiration, could not bear it longer than twenty minutes. No definite cause could be found for this difficulty. When the longer tube is introduced it seems to hitch against some hard prominence, then go on with a jump.

Oct. 9.—The patient has been keeping very well until yesterday. At the morning visit he was quite well; in the evening he vomited

and had a perfect scarlatina rash from neck to thighs. Temperature, 102.6°. To-day throat symptoms appeared, and in the afternoon he was conveyed to the Floss Hospital at Belvidere.

Extract of report in ward journal taken by the house physician, Mr. JOHN H. CARSLow, M. A., M. B.

At 5 A. M., on Oct. 18, there was sudden and profuse hemoptysis. The tube became choked and was removed when the bleeding ceased to occur in any quantity. Some expectoration with blood was observed at 9 A.M. The tube became blocked again at 10 A.M. and contained blood when removed to be cleansed. At 2 P.M. the tube again became blocked and was removed. It contained a little blood-stained mucous on its sides. It was while the tube was being cleaned that a sudden gush of blood took place and death occurred almost instantaneously.

It may be noted that it was while the child was in this hospital that a fulness or swelling of the neck was first noticed above the left clavicle.

With some difficulty I obtained permission to examine the parts, but being unable to be present myself, Drs. Carslow and Adams kindly made the examination. Their report is briefly as follows:

Body fairly well nourished. Surface extremely pale. The contents of the thoracic cavity healthy. The abdomen not examined. On dissecting down by the left side of the trachea, an abscess cavity was opened just above the level of the left clavicle and a quantity of thick whitish pultaceous material oozed out. The parts, consisting of the affected region of the spine, with the œsophagus and trachea and soft parts in front, were removed for further dissection.

These parts I subsequently carefully dissected and give here a brief description of the examination.

On dissecting the parts around the trachea, the innominate artery is found intimately attached to it. A probe passed down the trachea from the old tracheotomy wound runs readily into the vessel. The distance between the perforation into the artery and the tracheal wound is two inches.

On dividing the trachea downward in the middle line from the wound to its bifurcation, and spreading open the parts, an ulcer is found, surrounded with prominent and even pendulent projections of granulation tissue. In the centre of this ulcer is the opening into the innominate, through which passes readily a No. 5 catheter. The ulcer is about one inch from the bifurcation of the trachea.

An examination of the spine shows the following conditions: In the

middle line and to the left is an abscess cavity which has already been opened into (mentioned by Dr. Adams and Carslow). It communicates below, by a small opening, with a second abscess immediately in front of the diseased portion of the spine. On slitting up this communication, as also the abscess in front of the spine below, the affected portion of the column is completely exposed. This second cavity is lined by very dense walls and contains a thick caseous substance, with numerous pieces of loose bone of various sizes. It embraces the lower two cervical and upper two dorsal vertebrae. At the upper part of the floor of this space is an opening which leads backward into the spinal canal. It is large enough to admit the tip of the little finger which, when inserted, comes directly into contact with the apparently intact dura mater. There are numerous spicules of bone in the anterior membranous lining of the cavity.

REMARKS.—The case presents two special features which may be dealt with separately. One has reference to the original disease and its treatment; the other to the unfortunate result which caused death. While the post mortem has made clear what was the cause of the obstruction to respiration and deglutition at an early stage of the case, it was by no means easy at this particular period during life to come to any definite diagnosis. Three causes could be thought of as possibly accounting for these symptoms. One, that they were the result of spasm of the intrinsic muscles of the larynx and trachea; two, that they were due to pressure from an abscess; and three, that the trachea and œsophagus were bound down to the spine and kinked through the acute curvature of the latter. The persistence of the symptoms seemed against anything of the nature of spasm. The child was not suddenly taken bad, nor were there remissions, it gradually got worse. It is very probable, however, that the child did have an attack of spasmodic obstruction, such as so frequently occurs in cervical caries. It will be remembered that the report stated that on June 26th the child became asphyxiated and had to be brought round by artificial respiration. No mechanical obstruction of any kind could be found to account for the sudden onset of the symptoms. Thus, then, the possibility of spasm was dismissed as a probable cause and the diagnosis lay between abscess

pressure and acute flexure of the trachea and œsophagus. At this particular period there was nothing externally to indicate abscess; although at a late stage in the case a marked swelling did appear above the left clavicle. As I have already stated the operation was undertaken with considerable doubt as to its final issue. Unlike most cases of tracheotomy; the patient would be unable to powerfully expel any blood which might perchance trickle into the trachea when opened. And as the operation had to be done with much rapidity, and before stopping all bleeding points previous to opening the trachea, this accident did occur, blood trickled into the tube, the child was unable to expel it and at once stopped to breathe. It was then I passed in an ordinary steel bougie and hooked forward the trachea; and after artificial respiration the child came round and breathed comfortably. Any relaxation, however, of the forward pull at once induced symptoms of apnoea. It was this condition of things that led me to believe we were dealing with a kinking of the trachea rather than any external pressure. However, the post mortem has revealed the true state of matters, and the effect of the bougie must have been to in some way alter this pressure so that the trachea was no longer jammed forwards against the soft parts and sternum. The tubes used had to be longer than the ordinary tracheotomy tubes. Their passage was rarely difficult, though sometimes a sense of obstruction was felt.

During the course of the case we were always anxious to do without the tubes. We had constantly before us the danger of ulceration of the trachea from using them; and it was out of consideration for this that I had a second tube made of vulcanite, a little shorter in length, so that the point of pressure would be different. Unfortunately, only the one length would answer and still more unfortunately, the child could never bear the tube out long without symptoms of obstruction coming on and a speedy return of the tube being necessary. It is interesting to note the little inconvenience the patient at any time suffered from his tubes, and especially that no complaint at all was made during the last four months of his illness—the period during which it may be supposed ulceration was taking place at the end of the tube. On June 20th he complained of a

pricking sensation somewhere about the level of the episternal notch, but after the insertion of the new tubes he had no symptoms until the hæmoptysis which immediately preceded the fatal hæmorrhage.

In the cases of ulceration of the trachea from tracheotomy tubes which I have been able to find, most have occurred as the result of the use of metal tubes; but there is little reason probably why even a vulcanite tube should not lead to the same result if the pressure be long and continuous enough. I believe it not unlikely that the forward pressure of the tense abscess behind added not a little to the force with which the end of the tube was tilted against the anterior wall of the trachea.

As revealed at the post mortem the abscess in front of the diseased vertebræ was bounded by an extremely dense membrane. This, at an early stage of the disease, must have completely confined the pus in a limited area. Later, however, an escape would appear to have taken place on the left side above; and thus liberated, the pus formed a second cavity at the side of the neck, just above the clavicle. The examination of this original cavity, as narrated by the report, showed at its upper part posteriorly an opening through the body of a vertebræ leading to the spinal canal. This condition would seem to suggest that the paralytic symptoms were due to pressure; and that the subsequent considerable recovery was owing to the relief of tension in the original abscess from the escape of the pus upwards in the neck. The extreme pultaceousness of the contents of the sac may also be taken as an indication that the abscess was becoming quiescent and therefore that repair was taking place. The numerous sequestra, however, consisting of portions of the bodies of three or more vertebræ, would render anything like permanent recovery unlikely. The disease would be only ready to light up again on the slightest provocation.

With regard to the hæmorrhage which finally caused death, it would appear by no means a very rare event in cases of tracheotomy. In a case published by the late Mr. Royes Bell,¹ death occurred from sudden severe hæmorrhage fifteen days

¹Lancet, March 1st, 1879.

after the operation. No post mortem was made, but he expresses his opinion that ulceration had taken place into the innominate artery. He also refers to a similar case of Mr. John Wood's, where a silver tube had ulcerated its way through the trachea into the innominate artery.¹ The specimen exists in King's College Museum, London. Mr. Parker, in his work on tracheotomy, also mentions a case where the tube had ulcerated through into the innominate vein. Mr. Howse mentions having seen two cases in children at Guy's Hospital² where death occurred from a similar cause. Mr. Marsh refers to four fatal cases the result of ulceration.³

I may state that the parts of the case which forms the subject of this paper are preserved in the Museum of the Glasgow Western Infirmary.

¹Trans. of Pathol. Society, of London, vol. ix, p. 20.

²Guy's Hospital Reports, 3d series, vol. xx, 1875.

³St. Bartholomew's Hospital Reports, vol. iii, p. 364.

EDITORIAL ARTICLES.

THE PRESENT ASPECT OF THE IODOFORM QUESTION.*

In reviewing some bacteriological papers of surgical interest in vol. m. of this journal,¹ the present writer took the ground that all suppuration was due to the presence of micro-organisms.

This maxim can, at the present time, no longer be upheld without certain modifications, since it has been demonstrated that suppuration can be produced by other means than bacteria, and especially with the help of certain alkaloids extracted from the products of bacteria.

This question of the causes of suppuration is not yet ripe for discussion, the most recent experimenters² being at too great variance in their results.

But, curiously enough, the question of the etiology of suppuration has for some time been intimately connected with what is known as the iodoform question, and it was largely, howbeit indirectly, due to the interest excited by this question as to the efficacy of iodoform in surgical dressings, that some of the recent advances in our knowledge of the pathology of suppuration were made.

Although this latter question regarding iodoform is still, at the present date, far from being satisfactorily disposed of, yet certain new phases have been so prominently brought out by the more recent publications on the subject, that a cursory review of the more important features of the voluminous literature seems best adapted to assist in procuring for iodoform its proper place in the minds of those using it in daily surgical practice. Failing in this we may at least hope for what consolation may be gained from the knowledge that the suspicious attitude of distrust, with which many at present regard the drug, is not altogether without foundation in the scientific aspect of the problems involved in its discussion.

*The reference numbers in this paper refer to the References at the end.

Readers of the ANNALS will remember how Schede, in his paper on corrosive sublimate,³ related his experiences with iodoform. When he was first appointed surgeon to the Hamburg hospital and had found the typical Listerian dressing inadequate to successfully combat the influences of the unsanitary condition which prevailed in the hospital at that time, he first turned his attention to iodoform as an antiseptic dressing, in hopes of procuring primary union and an aseptic course of healing for all operative wounds. But in this hope he was greatly disappointed. For the condition and behavior of the wounds under iodoform was very much worse than it had formerly been under carbolic acid. Sepsis, erysipelas and even true embolic pyæmia occurred in the wounds treated by iodoform and, together with the anxiety caused by its poisonous properties, led to the speedy abandonment of the drug as a surgical dressing at the Hamburg hospital.

This announcement by a man of such high repute as Schede made some sensation among the surgeons of Germany and other countries, who, at that time, were using iodoform quite extensively and who had considerable faith in its antiseptic powers. But although many were induced by this publication to limit their use of iodoform, the majority continued to regard it with favor.

The substance was known in medicine as early as 1837,⁴ and had been used as a surgical dressing for ulcerative and granulating processes by various surgeons in France, England, Russia, Austria and Germany since 1864. But general attention was first directed to it by the publications of von Mosetig-Moorhof of Vienna in 1880,⁵ who recommended it as a valuable antiseptic, de-odorizing and anti-tuberculous agent, which could readily be applied to all wounds, whether recent or infected, and was well adapted for exclusive use in surgical dressings. The introduction of iodoform as a surgical dressing is therefore universally attributed to von Mosetig-Moorhof.

The consequence was that iodoform was speedily received with enthusiasm in a large number of surgical clinics and enjoyed a wide-spread reputation, which was, on the whole, but little interfered with by the publication of a number of cases of poisoning due to extensive use of the drug by a number of surgeons.

Mikulicz⁶ was the first to notice the toxic effects of iodoform and Koenig, in 1882, published⁷ a collection of cases sent him by invitation⁸ from various German clinics. Among the other surgeons publishing cases of iodoform poisoning are Henry,⁹ Schede,¹⁰ Höftmann,¹¹ Gorges,¹² Pfeilsticker,¹³ Czerny,¹⁴ Bum,¹⁵ Kocher,¹⁶ Sands,¹⁷ Küster.¹⁸

By these and other more recent investigators the necessity of minimizing the quantities of iodoform used in surgical work was brought out, and certain contra-indications of the drug became established. These latter are youth and old age, weakened constitution, weakened circulation, and heart and kidney lesions. The symptoms of poisoning as given by Fischer¹⁹ may be clinically classed in two groups, according to whether the symptoms develop gradually or rapidly. In the first case general malaise, vomiting, loss of appetite and mental depression obtains, accompanied by some fever and rapid pulse. Gradually melancholia supervenes with loss of will-power and increasing weakness. The patients, generally aged and infirm, may die in this condition, or recovery may take place.

The second class of patients are of the robust type. Headache, vertigo, sleeplessness, high fever, very rapid pulse are the first symptoms. Deliria, as in acute mania, sudden failure of strength and coma follow in comparatively short time. The maximal dose for surgical use in healthy adults is stated to be two drachms and a half of the powder. Von Nussbaum states that fifteen to forty-five grains have been known to cause fatal poisoning, while, on the other hand, four ounces have been used in one dose with impunity.

These cases of poisoning, however, only slightly interfered, as already stated, with the extensive use of the drug; the disadvantage of its poisonous qualities, which could, moreover, be avoided by careful use, were more than counterbalanced by its virtues: its property of exsiccating wounds and minimizing the secretions; its effect of establishing asepsis in all wounds; its property of preventing the development of luxuriant granulations; its de-odorizing qualities in offensive wounds; its convenience and portability as a dressing; its long continued action in wounds, etc.

All these advantages of this over other substances used for dress-

ings had gained for it the approval and confidences of the ablest surgeons, and in most clinics it was in extensive, although careful use. The continued endorsement of it by von Mosetig-Moorhof, who in 1885 had treated over eleven thousand cases with iodoform without ever once experiencing a single case of poisoning,²⁰ did much to gain favor for it, and among his endorsers were numbered Mikulicz²¹ Gussenbauer,²² Thiersch,²³ Billroth,²⁴ Schönborn,²⁵ Leisrink,²⁶ Koenig,²⁷ Marc Sée,²⁸ Küster²⁹ and many others. It was, however, established, and this fact was especially plainly brought out in the discussion at the Eleventh Congress of German Surgeons in 1882³⁰ and in the celebrated debate in the Gesellschaft der Aerzte in Vienna,³¹—that iodoform dressings were but little security against erysipelas.

But now, after the establishment of iodoform as a surgical dressing for more than six years, a bomb was suddenly burst in the camp of the iodoformists. For, in an experimental treatise published in the *Fortschritte der Medicin*, on the 15th of January, 1887, two Danish authors, Chr. Heyn and Thorkild Roosing, declared³² that iodoform was not only destitute of all antiseptic properties but worthless as a surgical dressing, and even dangerous to apply to wounds. This communication called forth a storm of protest both from practical surgeons and from scientific workers, and no small amount of personal abuse from the followers of v. Mosetig-Moorhof.

Although the authors of this important paper succeeded in clearing themselves from the charge of using superficial or unscientific methods, yet the conclusions arrived at by subsequent experimenters and writers have led to the modification and partial discarding of their first deductions by the general surgical public, through the development of a series of facts of practical and even general pathological importance and by means of a number of experiments first suggested by the above mentioned treatise.

Turning our attention to the original paper by the Danish authors we find them first (a) treating pure gelatine cultures of such micro-organisms as fungus, staphylococcus aureus pyogenes, pneumococcus bacillus subtilis, with iodoform, covering the colonies with a layer of the powder, and, after some days, inoculating culture test-tubes with

the first colonies. In no case was the growth of the micro-organisms in any way impeded. (b) Sterilized gelatine³³ containing iodoform powder in suspension in no wise impeded the growth of micro-organisms inoculated thereon, not even when the quantity of iodoform mixed with the gelatine amounted to 40 per cent. of the latter. (c) A four-per-cent. solution of iodoform in pure olive oil in no wise affected pure cultures of either *bacillus subtilis* or *staph. pyog. aur.*, not even when the development was favored by a temperature equal to that of the normal body. Moreover the micro-organisms developed equally well on a soil composed of equal parts of iodoformised oil and blood serum. (d) Coagulated serum obtained from calf's blood and representing a saturated solution of iodoform was next inoculated with fungus, *bacillus subtilis* and *staph. aur.*, and neither prevented the development of the micro-organisms nor exerted an inhibitory influence upon them. (e) A sample of *staphylococcus pyog. aur.* inoculated into a quantity of iodoform powder preserved its vitality unimpaired during one entire month. (f) Iodoform-spray produced by a powder-blower and directed over an expanse of sterilized gelatine, so that the surface was covered by a delicate yellow film, occasioned the growth of numerous colonies of fungi and bacteria. (g) A tampon of iodoformed gauze which had lain in the vagina for endometritis for twenty-four hours was examined by suitable methods and was found to contain a number of bacilli and small cocci. (h) A pure culture of *staphyloc. aur. pyog.*, which had been mixed with iodoform for a period of ten days, was injected into the joint-cavity of a rabbit and produced the same effect (suppuration of the joint) as a culture without admixture.

From these experiments the authors draw the conclusions that iodoform is not an antiseptic dressing material, and that unless a specially sterilized variety of iodoform is used, much mischief may be caused to wounds by using a powder-blower to pump air containing germs onto them, or by using a brush which may convey contagions, as iodoform itself is not capable of preventing such infections.

The first objection made to these statements, was to call the scientific ability and veracity of the authors into question.³⁴ This attack is only of interest in so far as it demonstrates how deeply grounded the

belief in the antiseptic properties of iodoform was with the Vienna school of surgery.

Then followed other protests of a more scientific nature, directed chiefly against the conclusions of Heyn and Roosing, which, while giving due credit to the authors for their methods and work, endeavored to point out that antisepsis might still be attained by iodoform even if it did not kill germs in the laboratory. Among these writers were Friedländer,³⁵ Poten³⁶ and others. Soon, too, followed a number of protests from active surgeons, who discussed the question from a purely clinical point of view, and endeavored thus to prove the antiseptic power of iodoform.

Most of the reviewers of the iodoform question, writing in periodical literature, may be mentioned here, with Koenig,³⁷ von Nussbaum³⁸ and Bruns.³⁹

The latter could prove with the help of Nauwerck⁴⁰ that the tubercle bacilli present in the walls of cold abscesses disappeared after the injection of iodoform in suspension into the abscess,—a practice which enabled him to cure a very large percentage of his cases. Similar results have been reported by French surgeons.⁴¹

In the mean time bacteriological workers repeated the laboratory experiments with iodoform, and with similar results as the original experimenters, so that the correctness of their observations became established beyond a doubt. The foremost of these was Lübbert, who had previously⁴² worked on the subject. He now published⁴³ his more recent experiments made with the *staphylococcus pyogenes aureus*, the germ *par excellence* of sepsis. He found that growths of this microorganism could not be influenced by the presence of iodoform, neither in the most diverse kinds of culture media (whether capable of dissolving the iodoform or not), nor in the animal body. The number of experiments made by this author is very great, those on animals alone numbering 43, and all confirm the results gained by the Danish authors.

Sattler⁴⁴ also confirms the results of Heyn and Roosing, although his paper is apparently directed against them. In over one thousand systematic experiments he proved that cultures of bacteria treated with

iodoform in various ways could still develop and retain sufficient vitality to give rise to new cultures after their inoculation on to new soils. He found, however, that in some cases iodoform did show an inhibitory influence upon certain colonies amounting in a few cases to complete suppression of vitality, provided that the iodoform molecules could be kept in close contact with each single micro-organism, and if, at the same time conditions could be maintained which favored the decomposition of the iodoform.

Tilanus⁴⁵ also endorsed the statements that iodoform frequently contains germs and is not capable of disinfecting soils used for cultures, a statement supported also by Behring⁴⁶, who, however, did succeed like Sattler, in getting an inhibitory influence of the iodoform upon the cultures, provided that he could distribute it finely enough throughout the media.

Baumgarten⁴⁷ who rubbed up pure cultures of anthrax bacilli and the micro-organism of the septicæmia of rabbits with the iodoform powder for half an hour and then introduced the mass beneath the skin of rabbits, found that death followed (from mycosis of the blood) just as certainly as when no iodoform was used. Staphylococci, when mixed with iodoform and introduced in the same manner, produced abscesses.

De Ruyter⁴⁸ got similar results. He too found no material influence of iodoform in preventing the development of germs on the soils, and also found germs present in iodoform; and could not prevent the death of rabbits inoculated with the micro organisms of the septicæmia of rabbits, anthrax, chicken-cholera, malignant œdema and micrococcus tetragenes, when these were mixed with iodoform. He did find that iodoform when dissolved in ether and alcohol (iodoform 1 part; ether 2 pts.; alcohol 8 pts.) exerted an antiseptic influence and attributes the result to iodoform, parallel experiments having shown that ether or alcohol alone did not have an antiseptic action upon germs. But these results may still be due to other influences than pure iodoform.

We may sum up the testimony of all these authors in the statement that iodoform may itself contain germs which may develop under suitable conditions at any time, and that iodoform does not possess suf-

ficient disinfectant power to kill germs in soil when mixed with them in coarse powder and in considerable quantities (up to 50 per cent of the soil). But it was not long before it was found that there did exist certain germs upon which iodoform exerted a speedily destructive influence. For Buchner⁴⁹ proved that even the fumes of iodoform could inhibit the growth of plate cultures of the cholera-germ. This action became apparent as soon as a vessel containing iodoform was placed under the same bell-glass with the cultures. Fumes of pure iodine did not have the same effect.

Neisser⁵⁰ calls attention to the fact that the influence of iodoform differs upon different germs. He experimented upon fifteen forms of bacteria and endorses Buchner's statements. Some bacteria, especially anthrax and those causing Koch's septicæmia of mice and rabbits, were retarded in their growth by iodoform. The staphylococci and the streptococci were in no wise affected by iodoform. These latter statements interest us here the most, as in the majority of cases in daily surgical practice our efforts are directed mainly against the germs of suppuration. Neisser has given us the key to understand why iodoform may do good service in some cases, but may wholly fail in others (such as in erysipelas of wounds).

Senger's⁵¹ experiments now also became known. He found like De Ruyter and others that when iodoform was introduced into a wound in rabbits at the same time with anthrax organisms, or at a later period, no antiseptic action resulted. If, however, the iodoform was first established in a wound, and later anthrax was inoculated, no poisoning resulted. Such rabbits remained healthy.

Whatever may be different in the results of experiments as to the degree of inhibitory influence exercised by iodoform in culture soils, all authors are agreed that iodoform is not potent as an antiseptic in laboratory experiments, and will not readily kill the known germs of suppuration on the soils. These facts, however universally acknowledged, are still at variance with general clinical experience. For the custom of dressing wounds of all descriptions with iodoform is still widely prevalent in spite of Schede's experiences. The question therefore presents itself as to wherein the difference between clinical observation and laboratory experiments lies.

A priori it is evident, that, granted the laboratory results may be credited, and that the clinical action of iodoform on wounds is not wholly a delusion, there exists some difference between the animal body and the culture soil, which cannot be set aside by any method of ordering the experiments, or else, that the development of bacteria in wounds is, of itself, not the cause of septic disturbance in wounds.

But as sufficient evidence had been collected by previous experimenters and observers⁵² to prove that the presence of bacteria in wounds, without the admixture of iodoform, does cause septic disturbance, there appeared for some time little hope of solving the problem. This has been latterly designated as the iodoform question, and to this the writers soon addicted themselves.

Friedländer⁵³ had advanced the theory that iodoform exerted no influence upon the germs as such, but in some way strengthened the vital action of the tissues, so as to enable them to win in their conflict with the germs, and thus resist infection. This action attributed to iodoform he termed indirect antisepsis⁵⁴. Lübbert⁵⁵ also made use of the term "vital action of the body" to cover our ignorance of what was wanting in the laboratory experiments to complete the antiseptic action of iodoform. Binz⁵⁶ recalled former experiments of his own which proved that iodine, when set free out of iodoform by submitting an oily solution of the latter to the action of the live tissues, would paralyse the mobility of the vessel-cells and prevent the extravasation of the leucocytes. In a similar manner, he pointed out, the germs might be affected in the tissues by the paralyzing influence of iodine. Poten⁵⁷ even went so far as to show how Heyn and Roosing had conducted their experiments in a manner to preclude the conversion of iodoform into pure iodine in their bacteriological experiments. These objections were subsequently answered by the Danish authors,⁵⁸ who stated that they had taken no precautions to prevent the formation of iodine in their oily solutions of iodoform used. Koenig⁵⁹ pointed out that the beneficial action of iodoform upon wounds, and especially upon tubercular affections, which he attested from clinical experience, might be solely due to the exsiccating action of the drug, and quoted Koch to prove that bacterial experiments are only of value when com-

bined with clinical observation upon human subjects. He also accused the Danish authors of failing to show whether the germs cultivated in iodoformised soils had in any way become influenced in their properties by this treatment. Garré⁵⁶ subsequently attacked Koenig's argument (that the chief value of iodoform consisted in drying up the wound); sufficient secretion, he said, was present even in so-called dry wounds, for myriads of bacteria to develop. This argument, that iodoform, although not antiseptic in the sense of inhibiting bacteria, could prevent their development in wounds by drying up the secretions and causing food-famine, has recently been again put forward by Jeffries, of Boston.⁵⁷

The theory of the formation of pure iodine by the vital action of the tissues on the iodoform was quite a favorite one for a time, and was adopted by many reviewers and admitted into a number of textbooks.⁵⁸

Another theory may also be noted here, advanced by Neudorfer⁵⁹, who, believing that bacteria caused inflammation by irritation through the nervous channels, explained the antiseptic action of iodoform by its rendering the sympathetic nerve-fibers insensible to such irritations.

But now these questions began to take on a new aspect with the publications of De Ruyter⁶⁰ and Behring⁶¹, who first brought into prominence the part played by the ptomaines in the presence of iodoform. De Ruyter proved by experiments that pus had the property of decomposing iodoform so that pure iodine was formed. Sterilised blood serum did not have this effect of setting free iodine out of iodoform; but as soon as septic germs (*staphylococcus pyog. aur.*) were added to the sterilised serum, decomposition of the iodoform proceeded as before.

Ptomaines, without germs, however, had a similar effect, and could alone decompose iodoform; but by this action the ptomaines were themselves destroyed. In others words, iodoform exerted a chemical affinity towards the ptomaines, and a new combination resulted by which the ptomaines were rendered inactive. Behring⁶¹ pointed out how in this manner iodoform was capable of preventing suppuration, without its having a disinfecting or inhibitory influence upon the micro-organisms of suppuration. (Sattler,⁴⁴ who concluded from his ex-

periments that the germs alone could decompose iodoform, also called attention to the fact that the ptomaines were rendered harmless by this process; he did not, however, lay stress on this latter fact in accounting for the antiseptic action of iodoform, but believed the germs were killed by the iodine). Neisser⁶¹ also believed some germs capable of alone decomposing iodoform.

If, now, this manner of explaining the effect of iodoform in keeping wounds aseptic by its action in binding the ptomaines is correct, there would no longer be a want of harmony between the laboratory experiments and clinical observation. To strengthen this supposition, however, it would be desirable to show: (1) that germs themselves alone without ptomaines did not cause suppuration in wounds; (2) that ptomaines alone without germs could cause suppuration in the tissues; and (3) that ptomaines mixed with iodoform, but without the presence of germs, would not produce pus in the animal body.

The first of these questions can be answered by a careful examination of the wounds under iodoformised dressings. For if experimental proof is at hand that iodoform can bind the ptomaines, we should here have the requisite conditions. Such examinations have been made at Mikulicz' clinic by Bassowski,⁶² with whom Stäheli⁶³, of Socin's clinic, at Bâle, concurs. Bassowski found that in about one-half of all antiseptic wounds under iodoformised dressings (applied after irrigation with carbolic solution) the staphylococcus albus was present, and that in about one-third of this number limited suppuration occurred. Whenever the staphylococcus aureus or the streptococcus pyogenes occurred, however, certain suppuration was caused, the progressive character of which was dependent upon the drainage.

These experiments fail to prove our theory. We should expect bacteria to be present, but no pus. Perhaps it is permissible to suppose that the iodoformized gauze was far too far removed from the depth of the drained wound to immediately affect the ptomaines there generated.

The second and third questions have of late been answered with accuracy by Scheuerlen and Behring.

Scheuerlen⁶⁴ boiled down extracts of four substances, a putrefying

infusion of rabbit-flesh, a staphylococcus infusion, and two of Brieger's ptomaines, cadaverine and putrescine—and enclosed them, after sterilisation, in spindle-shaped glass tubes. These he inserted under strict antiseptic precautions beneath the skin of rabbits, and after the wound had completely healed, he fractured the tubes subcutaneously. In all cases pus was found, although in small quantities, and only at the ends of the tubes, but still unmistakable pus. No micro-organisms were found in the tissues or in the pus, and this suppuration did not evince any progressive tendency. In fact the inflammation would have been an adhesive fibrinous one, had not the ptomaines manifested their property of preventing coagulation, as was shown by the state of blood in these subjects, which would not coagulate.

Grawitz⁶⁵ also experimented with cadaverine, and found that he could cause suppuration in some cases by subcutaneous injection of this sterilized ptomaine. If, however, living pyogenic organisms were added to these injections progressive phlegmons occurred with burrowing of pus. Brieger's experiments were similar in result.⁶⁶

These experiments prove that pus can be generated by ptomaines alone.

Behring⁶² now added another link to the chain of our reasoning. He repeated the experiments of Scheuerlen with ptomaines, but included sterilised iodoform in the experiments, so that it could develop its action upon the ptomaines under the skin and beneath the healed wounds. In this case no pus was ever formed. It was therefore demonstrated that iodoform could prevent the formation of pus by ptomaines alone.

Thus far the evidence now before us points toward the conclusion that iodoform by attacking the products of bacteria can be of great practical value as a surgical dressing, and the vexed iodoform question would appear almost solved. For we need only to imagine that a few micro-organisms introduced into the tissues could be successfully combatted by the vital action of the tissues (perchance by the leucocytes and phagocytes), unless assisted in their work by the ptomaines, but that iodoform by destroying these ptomaines again supported the action of the tissues, and assisted them to victory.

But here we must admit that we are merely theorising. For our knowledge of the *modus operandi* of septic infection is still very limited, although we have practically demonstrated the presence of micro-organisms in all septic troubles. Why should an infection in some cases lead simply to the formation of a small local abscess, in other cases to a fatal septicaemia? The experiments upon animals done with pyogenic germs are equally inconstant, in some cases true septicaemia having been induced, in others not, and oftentimes large quantities of germs being necessary to a positive result.⁶⁷

We can not expect a satisfactory answer to the iodoform question, until our knowledge of the relation of septic infections to suppuration and septicaemia is more advanced.

Moreover, the experiments with iodoform on animals quoted above still prove an obstacle to the forming of satisfactory conclusions, since they still do not harmonise with clinical experience. When micro-organisms (anthrax) were introduced into a fresh wound together with iodoform, the animals succumbed to the infection, just as when no iodoform was used. Are we to argue from this, as does Roosing⁶⁸, that the action of iodoform as an antiseptic is a chimera? We might suppose that in these cases the micro-organisms of anthrax entered directly into the circulation, where the iodoform action could not reach them. And in support of this theory we have the experiments of Senger who could not produce systemic infection with anthrax, if iodoform had been previously deposited in a wound. In this case the infection was probably not carried into such a number of newly opened lymph-spaces and blood-vessels. Again such a theory might explain von Mosetig-Moorhof's⁶⁹ experiences of the easy infection of granulating iodoformised wounds by a too promiscuous and unnecessary use of probes.

On the other hand, Baumgarten could not prevent the development of local abscesses by the introduction of staphylococci mixed with iodoform into wounds. Are we here, too, to suppose a primary introduction of the germs into vessels and lymph-spaces? It appears, then, difficult to account for the clinically established potency of iodoform in rendering septic wounds aseptic, since we know from Koch that in these cases the micro-organisms crowd the capillaries.⁷⁰

But if we cannot, with any satisfaction, theorise upon the action of iodoform in wounds, we can at least with some show of reason deduce a few practical conclusions from the mass of experimental evidence before us. Since we know that iodoform may contain germs, we should sterilise it before use; this may be done by washing it in sublimate solution. If applied with a brush to a wound the brush should not be used again. A powder-blower for iodoform should be used in a pure atmosphere only.

We will not look for an action of iodoform at a distance, an action throughout a large wound when only a portion of it is in contact with the powder, nor at the depth of a wound when only the surface is covered with iodoformised gauze.

We will not use iodoform during a primary operation in uninfected tissues since we know that septic infection will not be counteracted by the simultaneous application of iodoform. But we will esteem iodoform for its action in preventing the subsequent infection of wounds, both during the change of dressings and in case of accidental exposure. We shall still continue to use it sparingly in granulating wounds, as we cannot dispense with its property of favorably influencing the granulations, always taking care in suppurating wounds to prevent retention by adding protective over the iodoform (v. Mosetig-Moorhof⁷¹). In wounds already septic we may use iodoform as extensively as possible, endeavoring to bring the powder into contact with every part infected. We shall not expect it to influence already existing septicæmia or pyæmia.

The greatest benefit will be derived from iodoform by its use in operations about the mouth, vagina and rectum, where, owing to its property of destroying the ptomaines it acts as a powerful deodorizer. For the same reason its use on putrid surfaces is to be recommended.

On the other hand, the poisonous qualities of the drug, its disagreeable odor, its irritating effect, when suspended in the air, on the mucous membranes of the eyes and nose, prevent its extended use; and since we have found in tartaric and other vegetable acids a means of rendering our sublimate solutions more active upon albuminous liquids, and in creoline (in strong solutions, 5 per cent) a means of

keeping granulations in good condition, we are able to dispense with iodoform in all but its influence against the ptomaines, which is of so much practical value to us in our treatment of wounds of mucous membranes, and which cannot be sufficiently replaced by chlorine solutions or charcoal powder.

In conclusion we may glance at the specific action of iodoform upon other than septic germs. We have already seen that erysipelas is not in any way influenced by the presence of iodoform. Von Mosetig-Moorhof admits that erysipelas may attack wounds under iodoform dressings⁷², although he denies that it attacks iodoformised wounds more frequently than simply covered ones⁷³.

Anthrax has been referred to. After the experiment repeated above, no surgeon will think of combatting this infection with iodoform alone.

Of the gonorrhœa-coccus Welander⁷⁴ asserts that iodoform does not kill it, while Kreis⁷⁵ affirms that it does so.

The question of the antitubercular action of iodoform still remains open, although this question was one of the first ones raised. The French Congress of Surgeons of this year (1888) did not occupy itself to any extent with this question. In last year's very important publication of papers on this subject by Verneuil⁷⁶ much attention was given to it. Raymond and Arthaud failed to get satisfactory evidence of the specific action of the drug, while Verneuil and Verchère believed to have established it. Roosing's paper⁷⁷ is worthy of note as reporting a large number of experiments upon animals with tuberculous virus and iodoform. This author concludes that iodoform is powerless as an antitubercular agent. Clinically, however, Bruns and Nauwerck have satisfactorily demonstrated its healing influence upon cold abscesses, and in these cases the use of iodoform in ether deserves our confidence.

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W. W. VAN ARSDALE.

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. Wound-Treatment Under the Dry Aseptic Clot. By PROF. E. KUSTER (Berlin). As the method of treating wounds repeatedly described by the author from 1883 to 1886, with special reference to hernial and abdominal operations, has been called "open treatment," he here points out the falsity of this term and takes occasion to enlarge his statistics.

In the radical operation for hernia, he closes the wound as usual by suture of the sac-neck, tier sutures, and continuous suture of the skin—thus differing essentially from "open treatment." The whole is finally coated with iodoform-collodium until there is no further oozing of blood. No drain is used and no other bandage necessary.

To the 12 cases reported in 1886 he now adds 21 others. Of these 33, 13 were incarcerated crural hernias, 3 incarcerated inguinal, 2 irreducible or not retainable crural, 15 ditto inguinal. There were only 2 deaths, and these from extraneous causes. Amongst the remaining 31 there has been but 1 relapse. In 25 the cure was uninterrupted; in 2 there was retention of blood, simply requiring removal of a few stitches; in 1 a slight phlegmon, remedied in same way; in 2 narrow border gangrene; in 1 dry necrosis of the testicle due to ligations and not to this method. He claims that these cases prove the procedure to be strictly antiseptic.—*Centbl. f. Chirg.*, 1888, No. 11.

WM. BROWNING (Brooklyn).

II. Absorbable Antiseptic Tampons. By PROF. GLUCK (Berlin). At the surgical congress in 1881, the author referred to a case where he successfully bridged over a peritoneal defect by cautiously sewing in catgut strips. At that time he succeeded in implanting vari-

ous disinfected materials in the abdominal cavity of animals. In a later series of experiments, Dr. Gluck, after extirpation of the spleen in dogs, tried to prevent secondary hæmorrhage by covering the pedicle with an iodoform ether tampon and then fixing the tampon to the abdominal wall by a few sutures. This is called the intra-peritoneal tamponade. After a certain time on account of the peritoneal adhesions he was able to shell out the tampon extra-peritoneal. The advantages which he claims for this tampon are excellent hæmostasis, splendid drainage, thorough antiseptis, and finally, an inducement to the formation of adhesions which separate the wound cavity from that of the peritoneum. These tampons may become encapsulated and remain in place without causing any reaction. For these tampons, carefully disinfected sponges prepared with iodoform, ether and alcohol, and with iodoform powder, or catgut strips or skeins, or bundles of silk of various sizes prepared with iodoform can be used.

The name of absorbable antiseptic tampon in the strict sense of the word can only be applied to catgut.

Such tampons according to the author, would be fit for intra-peritoneal tamponade specially when the arrest of hæmorrhage is of great importance.

The absorbable tampon is penetrated and surrounded by granulations and is gradually replaced by connective tissue; of this, and of their capability of arresting hæmorrhage, and of not interfering with the healing of the wound, the author has thoroughly convinced himself by a series of experiments on animals. If after a rather loose tamponade secondary hæmorrhage occurred, it was not alarming, and the blood saturated gut formed an aseptic unirritating mass which in no way disturbed the healing of the wound.

The author warmly advocates the use of these tampons in many operations, for instance after removal of a goitre, when a large hole remains which favors the accumulation of secretions and phlegmonous inflammation, or in a radical operation for hernia, when the tampon can be used to close the opening of the neck of the sac.—*Deutsche Medicinische Wochenschrift*, No. 39.

F. C. HUSSON (New York.)

III. The Curability of Cancerous Disease. By DR. ED. V. MEYER (Zurich). This is a statistical consideration of the cases of malignant disease (tumors) in various regions operated upon by Prof. Rose (Zurich) during the period of 1867-1878. The growths included were examined by Prof. Ebert. They fall among the carcinomas, sarcomas and melano sarcomas. Of 64 cases there were 47 carcinomas, 11 sarcomas, 3 cysto-sarcomas, 1 melano-sarcoma, 1 fibro sarcoma and 1 carcinoma—sarcomatodes. There are 41 recoveries recorded. Twenty-two are still living from 20 years to 9 years after operation without return of disease. Of the 19 who died from other cause than their disease the time elapsing since operation ranged from 16 to 1 year.

Of those still living without return of disease 11 were carcinomatous tumors. The tumors in the successful cases were situated in the mamma, nose, lip, lower jaw, extremities, genitals. The regionary glands were affected in only 4 cases. In the cases of return of disease only 2 tumors (carcinoma) of the breast are recorded. The remaining tumors affected the nose, lip, cheek, upper and lower jaw. The metastases affected the liver (3 cases), stomach (1). The duration of life of those who died with return of their disease varied from 11½ years (1); 10½ years (1); 5 years (2) to 3 months after original operation.—*Zeitsch. f. Chir.*, bd. 28, heft 1 and 2.

HENRY KOPLIK, (New York.)

NERVOUS AND VASCULAR SYSTEMS.

I. The Operative Treatment of Hernia of the Brain and Spinal Cord. By DR. HILDEBRAND (Goetingen). In the clinic of Prof. Koenig we have reported the following cases of operative interference in congenital defects of the bony vault of the cranium or the framework of the vertebral column with protrusion of contents. *Cerebral Hernia*.—(1) A female infant, æt. 5 weeks, which on birth had a large tumor on the occiput (meningocele cerebrialis), the sack communicating by an opening two fingerbreadths in diameter with the cavity of the skull. Child showed no other symptoms. (2) A case of encephalocele in a female infant æt. 14 days born with large tumor on the fore-

head. The tumor, the size of a fist, covered the nose and the eye of one side. The sac contained fluid and brain-tissue. There were no other symptoms. Both cases operated upon died as the direct result of operation. The second case was unique in that it combined a tumor of the dura with an encephalocele. (3) A third case is recorded in a male infant at 11 days, in which a tumor the size of a child's head existed upon the occiput. In this case a large portion of brain tissue was removed in the operation. This case also proved fatal. The author thinks the removal of brain substance did not cause death. In all these cases there was great difficulty in maintaining a perfectly aseptic dressing and wound surface. These difficulties of antiseptics remain to be improved.

Five cases of spina bifida were also operated upon with two recoveries. As causes of death we have suppuration and meningitis (1). Undetermined (bandages and wound remaining aseptic, no inflammatory lesions post mortem) (2).

The author advises in all cases of cerebral and spinal herniæ a preliminary incision of the sac, with removal of the same and suture, if the contents be fluid. If cerebral substance exist in the sac an attempt at reposition is advisable; if it is successful a truss can be worn subsequently. If reposition of contents fail their removal is advisable. Ligature of the base of the sac before incising the same is only justifiable in meningocele with little cerebral contents. The fear of a loss and escape of cerebro spinal fluid can be met by immediate introduction of the finger into the sac after incision and closure of the communication with the skull by digital means. High position of the operated part and narcosis have also good effects. The author rejects the Schatz-Rizzoli methods.—*Zeitsch. f. Chir.*, bd. 28, heft 4 and 5.

HENRY KOPLIK (New York).

II. On Regeneration of Cerebral Tissue after Traumatic Lesions. By DR. PRUS (Lvov, Austrian Galicia). Cöen and many other observers most decidedly deny any probability of a genuine regeneration of the cerebral tissue and assert that in cases of brain lesions ending in healing, the newly formed structure does not

contain any new nervous elements whatever. To verify those statements, Dr. Prus has undertaken experiments on rabbits, dogs and guinea pigs, in which, having performed trephining, he made incisions (with Graefe's knife) into the brain, or excised wedge-shaped pieces of the cerebral substance, or grafted portions from one hemisphere to the opposite one. As a rule, the wound inflicted healed kindly more or less rapidly, according to the extent of the lesion. Quite frequently the union proved to be so perfect that not only the wounded area could not be distinguished from its intact neighborhood by the naked eye, but even microscopical local changes were found to be only trifling. "A most complete regeneration of the cerebral tissue took place sometimes also in cases of excision of wedge-shaped pieces, the proliferation process being now and then so lively that the newly formed tissue even rose above the level of the adjacent parts." Similarly, early, the cerebral grafts became often thoroughly united with the subjacent tissue; in fact, they failed to do so only in such cases where there had occurred a rather profuse hæmorrhage during the transplantation.—*Wiadomosci Lekarskie*, August, 1888.

VALERIUS IDELSON (Berne).

III. Traumatic Aneurism in a Child Under one Year.

By K. C. BOSE (India). The patient, a girl, æt. 11 months, while playing fell on the floor sustaining a bruise on the left cheek, which in the course of time assumed the form of a big pulsatile tumor, about the size of a potato. The health of the child in no way suffered from the swelling until one day she accidentally scratched the skin covering it, with her nails. Inflammatory symptoms supervened, and a medical practitioner ordered poultices to be applied, subsequently puncturing the tumor. Alarming hæmorrhage followed the puncture, which could not be controlled. When the author was summoned he found the child almost bloodless. The dressings were removed from the wound and the clots turned out, a small branch (malar) of the facial artery was feebly spouting and was at once twisted; the soft parts around the wound were sloughing; the following morning it was seen that the hæmorrhage had still continued; the sloughing process had spread to the outer canthus of the eye. A consultation was held, and it was de-

cided to adopt further measures. The facial artery was tied ; the inflamed tissues were freely incised ; all the clots were removed, and the wound dressed with boracic ointment. The hæmorrhage ceased from this moment, but the child succumbed after three days.—*Indian Medical Gazette*, July, 1888.

H. PERCY DUNN (London).

ABDOMEN.

I. **Laparotomy in a Child One Hour Old.** By ALEX. DUNLAP, M.D. (Springfield, Ohio). The child was perfect in every respect, vigorous and healthy, except that the bowels, commencing close to the duodenum, down to the sigmoid of the colon and omentum, with the mesentery, dragged through a small opening in the umbilicus, and had been developed in a sac formed in the umbilical cord. The sac would have contained about a pound and a half. He found that it was impossible to return them through the opening without enlarging it, and then when he commenced to enlarge the opening he found that the abdominal cavity was so contracted from the absence of the bowels being developed in it that it would not contain them without enlarging it. He therefore made an opening, commencing at the umbilicus, running up two inches, and then began stretching the walls of the abdomen with his fingers ; then catching portions of the bowels and forcing them down into the cavity, while assistants, with hooks passed through the cut edges of the walls of the abdomen, held them firmly up. In about twenty minutes he succeeded in forcing them in and closing the wound with five sutures and ligatures to the cord close up to the natural skin. The operation was performed October 2, 1887, without chloroform or an anæsthetic of any kind, and as far as any visible signs were manifested by the child in struggling, crying, shock or pulse, that it was suffering pain, there was none to be seen. There was nothing to indicate that the child was not enjoying the operation hugely, nor was there the least unpleasant symptom afterward. The child sleeps and nurses well, the stitches are out, and the cord is separating nicely.—*Journal Am. Med. Association*.

II. Four Biliary Calculi Eliminated Through an Abscess in the Right Iliac Fossa. By M. MOLLIERE (Paris). A house wife, æt. 20, had previously suffered from attacks of biliary colic; after one attack, the most violent, as swelling appeared in the right iliac fossa, which at first the size of a chestnut, subsequently rapidly increased in size. On admission a diffuse, fluctuating swelling was found in the right iliac region apparently immediately beneath the abdominal walls and exceedingly painful and tender. The skin was not involved and the leg was not drawn up. The case seemed to be one of perityphlitis or abscess of the broad ligament. A vaginal examination was subsequently made under ether, but nothing was discovered. An incision was then made a finger's length below a line drawn from the umbilicus to the right anterior superior spine of the ilium, giving exit to about 2 ounces of laudable pus, together with four biliary calculi, about the size of dice. No bile escaped during or after the operation. The abscess cavity was washed out with a sublimate solution, and a drainage tube inserted. The patient was discharged convalescent at the end of a month.—*Medical Press and Circular*, Feb. 8, 1888.

III. Congenital Cyst of the Urachus; Abdominal Section; Recovery. By LAWSON TAIT (Birmingham). The patient, a married woman æt. 20, was admitted with history of having become suddenly ill three months ago, with vomiting and faintness. She stated that a hard lump could be felt between the umbilicus and pubes, and this was accompanied with pain in that region; the general malaise, vomiting and faintness continued for a month. Until three weeks before admission she had great pain in passing urine, the urine being dark and thick. On vaginal examination the pelvis was found filled by a rather solid tumor with indistinct fluctuation. On palpating the abdomen the tumor was found to extend into the abdominal wall just above the pubes, in the middle line and to the left side. Abdominal section was performed by the author, the tissue in the middle line being found to be thickened and cartilaginous in density. On opening the peritoneum the tumor was recognized as a large cyst occupying completely the cavity of the pelvis and not adherent to its contents. It

was tapped and fetid flaky pus escaped, and its attachment was then seen to be a short sessile pedicle to the abdominal wall, about two fingers' width above the pubes. The true cyst wall was removed, the cavity drained, and its margins stretched to the abdominal wall. The peritoneal cavity was drained separately. Rapid recovery followed the operation. An account of the cyst wall is appended to the paper.—*Lancet*, Oct. 6, 1888.

H. PERCY DUNN (London).

IV. Laparotomy for Removal From the Abdomen of a Foreign Body Thrust Through the Vaginal Wall. By A. F. VINOGRADOFF (Kologriv, Russia). A peasant woman, æt. 30, came to the hospital on account of "abdominal pain which went up to her heart and interfered with her assuming a sitting posture." Having examined her abdomen, the writer found a very hard, stick-shaped, blunt-pointed body freely movable from side to side, lying in the abdominal cavity, near the umbilical region which "was bulging out in the shape of a tumor as large as a middle-sized apple." The whole posterior fornix of the vagina was occupied by a large scar slightly drawn in about its left end. On bimanual examination, it was at once discovered that pressure on the abdominal tumor permitted an exactly similar movable, narrow, hard body to be felt through the vaginal fornix. Naturally enough, the author concluded that he had to deal with a case of an intra-abdominal foreign body introduced through the vagina. Up to that moment the woman had been silent, but now, pressed by questions, she narrated the following singular story. She had been pregnant 15 days before, expecting labor in about three weeks. Her husband, having returned home in a drunken state, induced her to perform coition, to which she had consented only very reluctantly. During the act, she was seized with fears about her coming child and began to struggle. "The man grew furious, caught a carpenter's *arshine* (a wooden tool for measuring, 2 feet and 4 inches long) and thrust it into her vagina, violently rotating it several times in her inside." She lost consciousness profusely bleeding from her genitals. Ten hours later, labor pains set in, which expelled a live infant; the latter, however, survived only a few hours. There remained

a constant abdominal pain from that time, but otherwise the puerperium ran quite normally. Having resumed his examination after the woman's narrative, the author was able to introduce a probe through the above-mentioned depression in the vaginal scar, the instrument penetrating 6 cm. and striking a hard object somewhere in the abdominal cavity. It now became obvious that the wood *arshine* had been broken by a violent pressure against the sacral promontorium, the fragment remaining in the abdominal cavity. Laparotomy, as the only means for getting rid of the foreign body, was proposed, accepted by the patient, and performed on the next morning. The abdominal incision, 6 cm. long, was made parallel with the median line, slightly to the right from the navel. The foreign body (which actually proved to be a portion of a birch *arshine* measuring $18\frac{1}{2} \times 3\frac{1}{2} \times \frac{3}{4}$ cm.) could be extracted without any difficulty. Its sharply-pointed broken end, $\frac{1}{2}$ cm. long, was found thickly coated with fecal matter. "The circumstance"—the author adds—"undoubtedly points out that the splinter, at the moment of its introduction, had perforated the large bowel, probably, somewhere near the junction of the S. Romanum with the rectum." The abdominal wound was at once sutured, and an iodoform dressing applied. No peritoneal toilette was made; no drainage was employed. There was some fever for the first four days after the operation, but the woman's bladder and bowels worked normally all through. The wound healed *per primam* about the 9th day. The patient left quite well on the 23d day.—*Rüsskaia Meditzina*, No. 21, 1888.

VALERIUS IDELSON (Berne).

V. Hydatid Cyst of the Transverse Meso-Colon; Abdominal Section; Removal; Cure. By SIDNEY JONES (London). The following is a case of much interest, both on account of the diagnostic difficulties which it presented, and for the success which attended the operative interference of the surgeon. The patient, a plasterer, æt. 47, was admitted into St. Thomas's Hospital on June 22, 1888, complaining of a "lump in the stomach." About 18 months previously he had been under the author's care for the same complaint,

but the tumor at that time was very much smaller and gave no inconvenience to the patient, and it was, therefore, deemed inadvisable to interfere with it. Since then, however, owing to gradual enlargement and increasing pain, the swelling prevented him from following his occupation. The tumor was of the size and shape of a small orange, of firm consistence, and located a little to the right and below the level of the umbilicus. It was freely movable within a limited area, dull to percussion, painful on manipulation. Abdominal section was performed at the earnest request of the patient. The peritoneum having been reached, a large fold of omentum was turned to one side and a hard rounded mass was felt just above the transverse colon, imbedded among the layers of the meso-colon. The tumor was gradually separated from its surroundings, without difficulty, and removed. Deep silk and superficial catgut ligatures were used and iodoform dressings. The carbolic spray was kept going in the room during the operation. On section afterward the tumor was found to be a hydatid cyst, crowded with daughter cysts. The operation was done July 10; on the 17th the wound was found to have healed. Patient was discharged August 7, cured.—*Lancet*, Aug. 25, 1888.

H. PERCY DUNN (London).

VI. A Means for the Reduction of Hernia. By G. S. PERRO. After raising the pelvis upon a pillow, the thighs are flexed and abducted. The scrotum and hernia are seized with the left hand, elevated toward the abdominal walls and pressure made upon them. At the same time the index finger of the right hand is passed into the inguinal canal, and by a boring and rotating motion pressure is directed toward the horizontal portion of the os pubis. After a time the strangulated portion returns into the abdominal cavity, whereupon the other portions follow. The author cites 6 cases in which he succeeded in reducing strangulated inguinal hernia, in which failure had followed taxis by the ordinary method.—*Mediezin-skoje Oborsenje*, 1887, No. 15.

VII. Colotomy in Two Stages. By A. KNIE (Moscow). After the abdominal cavity is opened from the xyphoid process to the umbilicus, a length of from 6 to 8 cm., the wound edges are hemmed or

‘over-seamed’ to the peritoneum, the mesentery is divided and the colon drawn out into the incision and an opening made through the meso colon, care being taken to spare the vessels. The abdominal cavity is closed behind the isolated portion of intestinal tube in such a manner as not to interfere with its circulation, 2 or 3 sutures being applied to the left as well as to the right of the prolapsed colon. This latter can be opened in a transverse direction after the lapse of 4 to 6 days, or it may be resected.

There is one palpable objection to this procedure, and it is pointed out by the author. It can only be done upon the transverse colon, for it pre-supposes a somewhat moveable section of intestinal canal.—*Centralblatt f. Chirurgie*, No. 18, 1888.

G. R. FOWLER (Brooklyn.)

BONES, JOINTS, ORTHOPÆDIC.

I. Conservative Treatment of Ichorous Inflammation of the Knee-Joint. By DR. JULIAN A. KOSMOVSKY (Arkhangelsk, Russia).—A male peasant, æt. 33, of middling make and health, accidentally wounded his left knee with a carpenter’s axe, the wound measuring two inches, and being situated 3 cm. outward from the upper third of the patella. The injury was followed by moderately severe bleeding which was stopped by freely pouring commercial concentrated nitric acid into the wound. For a few days a considerable quantity of a sanguinolent synovial fluid was escaping from the incision, the man staying at home, but otherwise regarding the whole matter as a mere trifle. In a week or so the wound “healed,” as he thought, and accordingly he returned to his heavy work. On the next day, however, the wound “opened” again (the scab, probably, fell off) to profusely discharge thenceforward pus mixed with synovial secretion, while there appeared intense pains and swelling, accompanied with fever. The symptoms rapidly growing intolerable even for a Russian peasant (whose patience and endurance are truly phenomenal), the man sought his admission to the Emperor Alexander’s Hospital. On examination on the eleventh day after the accident, his knee was found to be flexed and mightily swollen, tense and red, exceedingly

painful and tender, the whole limb being cedematous and the wound looking unclean and discharging offensive thin pus. Having brought the patient under chloroform Dr. Kosmovsky straightened the knee, washed the whole very dirty extremity with a sublimate lotion, applied an iodoform dressing and fixed the limb in a wire splint. In spite of the application of ice and the administration of quinine and salicylate of sodium, the pain increased, the discharge remained offensive and fever assumed a hectic type, while there supervened obstinate cough, profuse night sweats, and an alarmingly progressive prostration. On the twenty-fourth day (after the lesion) the wound was enlarged sufficiently to freely admit a finger, and the joint cavity explored. It was found that the articular capsule was thickened, while the synovial membrane was covered with unhealthy flabby granulation and friable decomposing fibrinous deposit, but the articular ends of the bones were thickened, and the cartilages roughened, but comparatively very slightly. Taking into consideration the disease being essentially localized in the synovial structure, Dr. Kosmovsky resolved to postpone any major surgical procedure for a day or two, and first to give a trial to a conservative method. Accordingly, he thoroughly washed out the joint with a sublimate (1 : 1000) and a carbolic (5 : 100) solution (by means of Esmarch's jug), then introduced a drainage tube, powdered the cavity with iodoform, and applied iodoform dressing with elastic bandage. A striking improvement took place immediately; about evening the temperature fell (from 40° C.) to 38° C., the pain ceased, the man could soundly sleep without any hypnotics, there appeared appetite, etc. On the eleventh day the dressing was changed and the joint washed out with the sublimate lotion. About a month after the operation the drainage was removed; two weeks later the wound closed completely. The limb, however, was kept bandaged and immobile for other two months or so. About three months after the operation the man left quite well, with an ankylosed, but otherwise healthy looking joint. When seen a month later he was still walking about with two crutches, but Dr. Kosmovsky feels sure that with time the patient will walk easily without any support, though will remain lame forever. Analyzing his very instructive case, the author

points out 1, that a conservative treatment may prove successful even in seemingly hopeless cases of a neglected ichorous inflammation of injured large joints. As is known, Esmarch, Volkmann, Billroth, Kolomnin, Albert, Heitzmann and other authorities recommend under similar circumstances, either resection of the joint or an amputation of the limb above the articulation affected; 2, that a successful issue in cases like the above adduced must be attributed solely to adoption of strictest antiseptic rules; 3, that in every one and all of those seemingly hopeless cases, the surgeon's moral duty is to make an attempt at preserving the patient's limb, before resorting to any grave mutilation as involved by resection or amputation.---*Proceedings of the Arkhangel'sk Medical Society for 1887*, vol. ii, 1888.

VALERIUS IDELSON (Berne.)

II. Contribution to the Surgery of the Joints. By P. SENDLER (Magdeburg). The author gives at length the histories of fifteen operations on the knee in 13 patients. Most patients being children two and a half to four years of age, adults, twenty to thirty-five years. Fifteen operations were performed, the disease affecting both knees in two patients. Four of these operations were arthrotomies; with two exceptions tuberculosis was the indication for operative interference. In five cases in which an attempt was made to obtain favorable ankylosis four were successful. In those cases where tuberculosis of both knee-joints was present ankylosis was desired in one knee only and obtained. There is nothing new brought forward in the paper.—*Deutsch Zeitschr f. Chir.* bd. 27, heft 3 and 4.

HENRY KOPLIK (New York).

III. "Resectio Dorsalis Tarso-Metatarsæa." A New Operative Procedure. By R. GRITTI. This operation is designed for the removal of the basis of the metatarsal and the adjoining tarsal bones. The operation is performed as follows: A cross incision of the skin is made over the instep, somewhat above the basis of the metatarsal bones; at each end of this an incision is carried, the one along the outer and the other along the inner border of the foot. These, when completed, should mark out a letter **H**. The two rect-

angular flaps are turned back and the bones exposed. The navicular and cuboid bones are sawn across, in a direction from the dorsum toward the plantar surface, and upon the same level. In the same manner the metatarsal bones are sawn through, and the parts to be removed loosened from their connection with the plantar surface of the foot. Ligature of the anterior tibial artery will be necessary; the surfaces of the sawn bones are to be sutured, as well as the tendon of the extensor longus pollicis muscle, and the external wound closed.

The operation is indicated in cases of injury or disease of the tarso-metatarsal articulations.—*Gaz. degli Osp.*, Nov. 2, 1887.

G. R. FOWLER (Brooklyn).

IV. Contribution to the Value of the Osteoplastic Resection of the Foot after Wladimiroff-Mikulicz. By DR. KARL BAUERHAHN (Berlin). The author contributes three cases operated upon by Professor Rose to the literature of the above operation the foot first carried out by Wladimiroff, and subsequently also in a modified manner by Mikulicz. Thus far 27 cases occur in the literature, which have been the subjects of this operation on the foot. G. Fisher has tabulated 15 cases, Zesas 19, and Ch. Fenger, 22 cases respectively. The operation was carried out in the majority of the cases for caries. In the first case of Mikulicz it was performed for a loss of substance caused by a syphilitic ulcer. Rousseau performed it in a case of badly united and complicated fracture. In the case of Niehaus there was a trauma. Slifassowski performed this operation for a sarcoma of the periosteum involving the calcaneus. This latter case adds another indication (malignant growths) for the performance of this operation. The operation of Wladimiroff-Mikulicz has been carried out upon adults in the majority of cases. In three cases children under 13 years of age were operated upon, the indication here being caries. Most of patients were of the middle age of life. The hope expressed by Mikulicz that in cases of tuberculosis a definite cure could be obtained because the operation was performed in healthy tissue, has not been realized. In several cases of caries a return of disease occurred some time after operation; in four cases of

the statistics of Fisher, 5 of Zesas' and one of Prof. Rose's cases. In the latter case caries of the pelvis also appeared. The return of the disease is especially liable to occur in the young patients (3 cases of Zesas under 12 years). Generally when a return of disease occurred the amputation of the leg was resorted to. The author concludes that after the osteoplastic operation patients need no apparatus; they have a stump both useful in standing and walking, the operation is especially gratifying in its results upon traumatic cases. It is superior to the operation of Syme and Pirogoff, in that the walking surface is greater, and the toes become after a time elastic. The results of the osteoplastic resection of the foot are not less favorable than those of other operations upon the foot.—*Zeitschr. f. Chir.* bd. 27, heft. 5 and 6.

HENRY KOPLIK (New York).

REVIEWS OF BOOKS.

HUNTERIAN LECTURES. By THOMAS BRYANT, F.R.C.S. London: J. and A. Churchill, 1888.

Although the author apologizes for the material of his lectures, we feel that his example of selecting "subjects with which practical surgeons have long been familiar, and the importance of which they have recognized, but concerning which there is little or no literature," is a happy one which may, with profit, be copied by writers who can bring such an amount of clinical experience as can Mr. Bryant to illustrate and prove every part of their work.

Good tales bear well being retold, and although there may be nothing really new in these Hunterian Lectures, we feel confident that whether they be read by the student or the experienced surgeon, he will rise from their study with the feeling that his time has been very profitably spent. In the first lecture,—“On the Causes, Effects, and Treatment of Tension as met with in Surgical Practice,”—the author, after defining what is meant by tension and showing how it injuriously affects different structures according to the nature of the tissue subjected to its influence, points out that the one subjective symptom to which tension gives rise, is pain, and that this varies with the degree of the tension and the density of the part affected. After adducing numerous cases in illustration, the subject of tension in regard to inflammation is discussed, and a reflection is made on teachers which we would hope is not wholly called for—“students are taught that death of inflamed tissues from tension is due to the cutting off of the blood supply to the inflamed part.” We can conceive that students may give such an explanation, although they may have been taught that death of the tissues is brought about by blood stasis. In discussing treatment, the author insists on the advisability of incising or puncturing inflamed and tense tissues at an early stage in order to give vent to pent up fluids and thus to relieve pain and forestall pus formation rather than to wait until “matter” has formed, which means waiting until there has been destruction of tissue. All practical surgeons will subscribe to this.

In the part of the lecture devoted to tension in wounds, Mr. Bryant remarks "the use of the drainage tube, or due provision for complete drainage, is a point of such primary importance as to relegate to a secondary position, the mode and character of the dressing which is employed." We would rather see the antiseptic treatment of wounds given a first place, and the drainage tube relegated to the secondary position, as the most recent surgical methods aim at securing healing without the employment of drainage tubes.

In the second lecture "On the Effects of Tension, as Illustrated in Inflammation of Bone and its Treatment" the numerous cases recorded are of extreme interest and serve to illustrate the subject in a way which must carry conviction to the mind of every one.

A method of comparing the temperature of the tissues covering an inflamed bone with the heat of the adjoining parts is concisely given on page 49 and we can speak from experience how efficient the procedure is. At the end of the lecture an excellent summary is given in about two pages, of which the following paragraph will serve as an example :

"In the early or hyperæmic stage of inflammation of bone, before destructive changes have taken place, experience seems clearly to indicate that the relief of tension—as indicated by a dull aching pain, etc.—by means of drilling or trephining into bone, may arrest the progress of the disease, and help toward a cure by resolution ; whereas, in the exceptional cases in which this good result does not take place suffering is saved and destructive changes are limited."

The third lecture which treats of "Cranial and Intracranial Injuries" should be read by every surgeon, as it is pregnant with important practical suggestions illustrated in the fullest manner by concise reports of cases.

It is clearly proved that the term "Concussion" is vague and delusive, as in all cases there is some more or less severe lesion of the brain ; Mr. Bryant proposes therefore that in future such cases should be described as those of "Injury of the Brain from Concussion," which seems to us a very valuable suggestion, worthy of general adaption.

Throughout the lecture two main clinical points are kept in view : (1) That all injuries of the head should be estimated *primarily* with reference to the amount of *damage* to the cranial contents and (2) that head injuries should be estimated *secondarily* with reference to the cranial contents *becoming* involved.

The suggestion that *all* cases of scalp wounds leading down to bone should be treated as in-patients for a period of two or three weeks is

undoubtedly sound, but, we fear, difficult to carry out in the present financial condition of our hospitals. Fortunately, the antiseptic treatment of these wounds has removed many of the secondary dangers, so that where there has been no sign of brain injury, we may still be justified in only making such cases in-patients for a few days.

The question of trephining or of withholding operative treatment in certain fractures of the skull is very instructively discussed and illustrated by carefully selected cases.

We can heartily endorse the author's conclusion: "I have some confidence in the belief that, if the views I have expounded were accepted, the teaching and understanding of cranial or cerebral injuries would be greatly simplified."

A. W. MAYO ROBSON.

THE TREATMENT OF EMPYEMA. THE PROCESS OF REPAIR. A METHOD OF SUBCUTANEOUS DRAINAGE AND IRRIGATION. By G. J. ROBERTSON, M. B., C. M., Surgeon to the Oldham Infirmary.

In this small work Dr. Robertson divides his subject into two parts. The first deals with the mode of repair after operative interference; in the second he describes his method of operation, and relates cases bearing on his treatment. With regard to the process of repair, he draws attention to the vagueness of writers in their description of the subject. For an authoritative opinion he quotes from some lectures delivered at the Hospital for Consumption, Brompton, by Rickman Godlee, as follows: "The whole interior of the pleura which has suppurated becomes lined, if not with actual granulations, at least with a material which, like them, in its advance to a more highly organized condition, necessarily undergoes a process of contraction; and that which occupies the angles between the lung and chest walls, lung and diaphragm, lung and mediastinum, and diaphragm and chest walls is constantly drawing these structures toward one another." He appears to doubt the above theory as not accounting for those cases which heal up rapidly and in which the lungs appear to expand without any deformity of the chest wall. That the method of cure is different in the latter cases is undoubted, but that it holds good in chronic cases the examination of pathological specimens leaves no doubt. Dr. Robertson's own view is that a valvular arrangement exists, whereby fluid is allowed to escape, but an effective barrier is offered to the entrance of air. This condition he considers to be most nearly effected by the use of Listerian dressings, but considers that there are many serious objections to their use. He thus criticises them:

(1) It has to fulfil two purposes, and the conditions necessary for the one are antagonistic to those required for the other. The more closely it is applied and the more saturated it becomes with pus, the better does it serve as a valve. Drainage is best secured when it is porous and loosely applied.

(2) It is faulty inasmuch as it does not afford facility for detecting when it ceases to be effective for either purpose. The conditions are not favorable for ascertaining when air does or does not enter the cavity during inspiration. The incidental exposure of the wound entails the risk of collapse of the lung, an accident which cannot but delay the process of repair in proportion to the frequency of its recurrence. To sum up: The pressure of the fluid in the pleura being all or nearly all removed, the parietes begin to assume their normal movements, and the air being excluded the lung re-expands. Dr. Robertson then describes his method of operation, by which he believes this result may be obtained.

He inserts two drainage tubes into two contiguous intercostal spaces, preferably the mid axillary line. The ends both go down to the lower limit of the empyema. The lower one is short and is used for irrigation; the upper one is long and passes into a bottle containing an antiseptic fluid. Sufficient opening is made in the spaces with a bistoury to admit the tubes, and antiseptic dressings applied outside. He then cites thirteen cases treated by this method. The most striking fact which forces itself on one's attention on reading them over is that the oldest subject is only nine years of age. Do no cases of empyema in adults find their way into the Oldham Infirmary? If so, how are they treated? Or does Dr. Robertson consider his treatment only applicable to children? If so, he does not say so. Every surgeon knows that empyema in a child usually turns out satisfactorily by almost any treatment. Godlee quotes four cases out of thirty in which the empyema disappeared after one tapping.

Let us see what results he got in children by free incision and drainage. Total cases 23; average length of treatment 8 weeks. One death (cause not stated). One or two very chronic cases are here recorded which, as often happens, took a long time to heal after the operation, and consequently increase the length of treatment. On the whole, however, the results are highly satisfactory. Now for Dr. Robertson's figures. He had 13 cases, average treatment 17 days. *Three deaths from pyæmia.* There can be no doubt that in Godlee's cases the tube could in many be removed much sooner than it was, and so much reduce the length of treatment. But a week or two is

not of much account to a child to be kept under observation. And it must be remembered that as far as lung expansion goes Godlee's cases will probably compare quite as favorably with Dr. Robertson's. Lastly as to the dangers of the two methods. In 23 cases Godlee had one death, or 4.8 per cent. In 13 cases Dr. Robertson had three deaths or 23 per cent! We can only conclude that, however correct Dr. Robertson's theory may be, his practice is far from satisfactory.

H. H. TAYLOR.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By H. C. WOOD, M.D., LL.D., Professor of Materia Medica and Therapeutics and Clinical Professor of Diseases of the Nervous System in the University of Pennsylvania. Seventh edition. Philadelphia: J. B. Lippincott & Co. 1888. 8vo., pp. 908. Price in cloth, \$6.00.

The fact that a medical work has reached its seventh edition is sufficient evidence of its acceptability to the profession, if not of its inherent value. The book under consideration complies with both of these requisites for success. It deals, as the author states, with "medical agencies, drugs and poisons, with especial reference to the relations between physiology and clinical medicine." It does not attempt, however, to discuss all the drugs which have put forward claims to therapeutical value, the author having exercised a careful censorship. Strophanthus, adonidine, paraldehyde, antefebrein, lanolin, saccharin and many more are admitted to consideration, but duboisia, Jamaica dogwood, quebracho, pulsatilla, sulfonal and a host of other agents, possessing therapeutic powers in varying amounts, fail of recognition. The author's selection, however, has been attended with wise discrimination and doubtless the ultimate verdict of the profession will agree with his. He has not indulged in a consideration of the drugs, used as antiseptics, from the surgeon's standpoint, and the reader looks in vain for an account of the local action of these agents, or for an account of general intoxication from local use. The experience of recent years has gone far toward the attainment of conclusive results in this direction, the consideration of which is of the greatest importance in surgical practice and is certainly not out of place in a work upon therapeutics. As a whole, however, the work is the ripe product of many years of careful study and extended experience, and forms probably the most reliable presentation of the subject extant.

JAMES E. PILCHER.

THE ETIOLOGY, PATHOLOGY AND OPERATIVE
TREATMENT OF RACHITIC DEFORMITY, AS
BASED UPON ONE HUNDRED AND FIFTY-
EIGHT CONSECUTIVE OSTEOTOMIES,
WITHOUT SUPPURATION.¹

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ANY ONE who has read Sir Walter Scott's touching and sympathetic story of the "Black Dwarf" can appreciate the intense mental suffering which a person of a sensitive and highly organized mental constitution experiences on account of marked bodily deformity. This ideal being, who was represented as residing in solitude, haunted by a consciousness of his own deformity, and a suspicion of his being generally subjected to the scorn of his fellow-men, was not altogether imaginary. As he says of himself, "I am a poor miserable outcast, fitter to have been smothered in the cradle than to have been brought up to scare the world in which I crawl." The sense of his deformity haunted him like a phantom, until at last, he became alternately a pilgrim and a hermit, suffering the most severe privations, not indeed in ascetic devotions, but in abhorrence of mankind. Such a character could only have been suggested by a close and intimate acquaintance with rachitic deformity.

Rachitis is a disease of early life. All who are connected with our large dispensaries must have observed the great prevalence of this disease among the applicants for medical aid

¹Read before the American Orthopædic Association at the Congress of American Physicians and Surgeons, Washington, September 17, 1888, with presentation of 100 original photographs.

While more common among the children of the poorer classes, still it is not infrequently met with among the children of the better classes of society, perhaps not in its most advanced stages, yet it is sufficiently well marked in some of its manifestations to be easily recognized. While not so common in this country as in some of the European countries, yet according to Dr. Parry, in the Philadelphia Hospital, 25% of all the children between two months and four years of age are rickety, while in some of the European countries, especially England, Scotland and parts of Germany, the proportion is even greater. The recent report of the collective investigation committee of the British Medical Association states that rickets, though not unknown in rural districts, is mainly a disease of towns and industrial regions and especially of large manufacturing towns. In the densely populated and industrial portions of England and Scotland it is especially prevalent, and is all but universal in Glasgow and its suburbs. In the New York Infant Asylum, a few years since, one in every nine, by actual count, presented marked rachitic symptoms. In this country the disease occurs for the most part in children whose parents were born in Europe, principally the Anglo-Saxon and Latin races. It is comparatively rare in children of native Americans, with the possible exception of the Negro race, among whom it prevails to a most astonishing extent.

Rachitis or rickets is a disease that should command not only the attention of the surgeon, but that, of the general practitioner as well, in order that its results, deformities of the limbs and abnormal shapes of the chest and pelvis, may be prevented. Rachitis has been defined by Bouvier as an affection of the young, a vice of ossification, with softening, curvature and deformities of the bones. This definition is clear and precise, and is founded on a lesion and a condition which is anatomically well characterized, but it does not fully cover the ground. Rachitis is a general constitutional defect, and the osseous structure is involved in common with every other tissue of the body. It should be remembered that rachitis is not a disease of the bones alone, but according to the most recent writers is a general nutritive disorder which affects all structures, not only bone but muscles, ligaments, skin, mu-

cous membrane, the blood, arteries and the nervous system. It is complicated with or dependent on disorders of the digestive or respiratory apparatuses, which are preceded by a disposition probably created by an undue width of the arteries. (Jacobi).

One of its prominent symptoms is muscular debility—sometimes so great as to be mistaken for actual paralysis. The patient may appear plump and fat, but his muscles are flabby.

Changes in the subcutaneous tissue are also present; fat is either present in excessive amount, or deficient. Changes in the mental and moral faculties, are also present. Enlargement of the spleen, liver and of the lymphatic glands, in different portions of the body are common accompaniments of this disease. Rachitis affects the growth of the teeth. The appearance of the teeth is retarded, or if they make their appearance they soon drop out. Sir William Jenner states that if the child have no teeth by the ninth month, it is probably rachitic. Usually only one set appears and these are wide apart and few, as seen in Fig. 18. This fact will be further illustrated in the cases to be presented.

While the above mentioned symptoms are manifesting themselves, most important changes are taking place in the bones. These consist in an hyperæmic condition of the primordial cartilages of the epiphyses, with copious deposits of new material in that region and also under the periosteum with softening of the diaphyses, so that curvatures occur, and while this process continues, true ossification of the bones does not progress.

HISTORICAL.—There is good reason to believe that this disease was described by Hippocrates and Galen. Boëtius and Serverin, who claim that there can be no complete medical histories without the mention of these names, have found among the writings of these authors descriptions of diseases analagous to rachitis. Others believe that there has always existed a species of rachitis, even although this affection was never scientifically described.

Literature has preserved even to our times types of deformity such as that of *Æsop* and *Thersites*, who lived centuries ago and presented apparently types of rachitic deformity.

The first scientific description of the symptoms and pathology of this affection was written by Whistler and appeared in England in the early part of the 17th century. While to England belongs the honor of first describing the disease, it has also the not so enviable distinction of having the disease denoted by its adjective appellation, for rachitis still goes by the name of the English disease; in French, *Morbus Anglicus*; German, *Englische Krankheit*. Glisson, about the year 1650, gave a description of the disease and used the term *rachitis*.

ETIOLOGY.—In studying the etiology of rachitis we must approach it from two points of view, its predisposing and its direct causes. The predisposing causes of rachitis have been studied by Beneke from an anatomical standpoint. He found that the arteries in rachitical patients were abnormally large.

In three cases where the arteries of the neck were unusually large, the children died young, one of hydrocephalus, one of an abnormally large skull and one suddenly. The period of life at which the arteries are found to be abnormal corresponds to the time at which the rachitic process is most marked, viz.: the second to the fourth years of age. This affords an explanation of the hyperæmic condition of the bones, especially at the junction of the epiphysis, where the growth of the bone is most active, and also of the increase of development and eburnation of the bones after the morbid process ceases.

As above stated in rachitis the normal proportion of the blood vessels to the heart is greatly changed. Of this Jacobi, well says (Address, February, 1887): "As it is not probable that a chronic disorder in its slow progress should work a rapid change in the blood vessels, the inference is a sound one, that if the disorder can not have altered the blood vessels, these must have given rise to or be connected with the nature of the disorder.

"For instance, in rachitis the heart is of average size but the arteries are abnormally large. Great width of arteries lowers blood pressure."

Thus is best explained the murmur first discovered by Fisher, of Boston, over the fontanelles of rachitical babies,

very much better than as Jurasz asserts by osseous anomalies in the carotid canal. Another result of the low blood pressure is the retardation of the circulation in the muscles, with flabbiness and incompetency as consequences, and still more about the epiphyses, which swell and soften. It is very much less the cartilaginous condition of the epiphysis which gives rise to rachitis (for some of them do not ossify before the twentieth year or later, at a time when no rachitis is observed) than some constitutional disorder of which the principal one may be, as stated, the unusual size of the blood vessels. There are other anomalies in rachitis which aid in the retardation of circulation, viz. : the large size of the liver and the smallness of the lungs. Through these influences ossification becomes irregular and defective. The slowness and irregularity of the circulation, dependent on these conditions, together with the watery condition of the blood, are the predisposing causes giving rise to catarrh of the pharynx, larynx and respiratory organs in general, with which rachitical subjects are so generally affected.

There is another interesting consideration to which one writer has drawn attention: Owing to the relatively large diameter of the arteries a greater number of red blood corpuscles is required in order to properly fill them. Now, in the rachitic, owing to the impairment of the digestive and hæmatopoietic organs, the blood-making process is not so active, so the tissues must necessarily show the effect of the relative increase of the watery constituents of the blood, a condition which the biochemists have found to uniformly exist in the rachitic.

In the healthy infant the pulmonary artery is larger than the aorta by not more than four millimetres. In the rachitic subjects examined by Beneke, the pulmonary artery was found to be proportionately much greater in size, thus affording an anatomical explanation of the pathological processes so frequently found in the lungs of the rachitic. For, while the amount of blood carried to the lungs is relatively greater than in the normal condition, owing to the disease of the bones of the chest, the lung space is contracted and consequently the circulation of blood in the lungs is impeded.

There is also a variation of size in the other organs of the rachitic, and the combination of variability found in the rachitic subject does not correspond with that found in other constitutional disorders, as for instance in scrofula, Beneke found a small heart, unusually narrow arteries and a small liver. From these considerations the conclusion is drawn that these variations of size are not the results of the disease, but that they are congenital and stand in some causal relation to it.

The direct cause of rachitis was attributed by Glisson to the inequality of nutrition by the arterial blood, and curvature of the long bones to their superabundant vascularization.

John Mayow (1761) held a disturbance of the innervation responsible; Zeviani (in the same year) improper food in general and particularly prolonged lactation; others have attributed it to an undue production of acid and the softening of the osseous tissue thereby. C. Heitzmann fed both herbivorous and carnivorous animals with lactic acid and found the cortical layers of the bones softened and the medullary substance hyperæmic and claimed to produce osteo-malacia in the former and rachitis in the latter. It cannot be doubted that rachitis occasionally occurs as a congenital disease.

Cases have been reported by Chiari, Jacobi, Burrall and Gueniot. Kassowitz examined many still born infants and also children dying shortly after birth, and in a large majority found rachitical changes in the ends of the bones. In many of those, who lived several weeks after birth, the rachitical changes were advanced to such a degree that its uterine origin became clearly demonstrated. I have observed well marked bowing of the tibia at birth. That direct inheritance is not a constant or essential factor is proved by the fact that perfectly healthy parents, who have never been rickety and show no trace of it may have and constantly do have rickety children. We may then eliminate inherited tendency, at all events, as an essential condition.¹

Schwartz (*Med. Woch.* 1887) has demonstrated by an examination of 500 children within an hour after birth at the lying-in

¹Dr. W. B. Cheadle. *Brit. Med. Jour.*

hospital in Vienna, that the signs of rachitis can usually be found at that early period, showing the disease to be, at least occasionally, intra-uterine in its commencement. Of the 500 children, 97 were without signs of this disease; 188 had well marked rachitic rosaries together with rachitic changes of the cranial bones, varying from an abnormal weakness along the border of the sagittal suture to an almost complete defect of ossification of the cranium; 155 had well marked rachitic rosaries without the changes in the cranial bones; 36 had the changes in the cranial bones alone, and 24 presented only slight swellings at the unions of the bones and cartilages of the ribs. Of the children born in the seventh lunar month, 14 were rachitic, 1 normal; in the eighth lunar month 27 rachitic, 4 normal; in the ninth lunar month, 50 rachitic, 12 normal. Fifteen of the mothers of rachitic children presented signs of having suffered from a high grade of rachitis. Of six cases of twins, in 3, one child was normal, while the other was rachitic, in the other three, both children were rachitic.

His conclusion is that every child should be examined as soon after birth as practicable, and if any signs of rachitis are found to be present, active treatment should be immediately instituted. (*N. Y. Med. Jour.*)

Rachitis is a disease occurring during the rapid development of the tissues, therefore anything that interferes with normal growth and development is apt to change physiological function into a pathological condition and produce rachitis. Therefore all influences that impair the nutrition and injure the strength in parent or the child itself, such as bad feeding, foul air, damp, cold rooms, want of sunlight, want of exercise and want of cleanliness must be looked upon as predisposing causes of this disease.

Of the many special causes that have been brought forward at one time or another as the essential agent in the production of rachitis, that of special defects in diet or a faulty composition of the child's food has perhaps the strongest claim on our attention. In a discussion on rickets at the annual meeting of the British Medical Association, August, 1888, Dr. W. B. Cheadle in introducing the subject, claimed that "the food factor is the only factor which is anything like constant." He believed

it traceable in every instance. Syphilis may be absent, hereditary taint may be absent, all external condition of mal-hygiene may be absent ; yet, in spite of this, a child brought up on artificial food may become rickety. The fault lies in some defect in the artificial food, in some quality in which it differs from the non-rachitic food of human milk. The form of improper feeding most frequently associated with a rickety constitution is a farinaceous diet.

An examination of the different artificial foods shows a grave defect which is common to all ; they are remarkably deficient in two important elements.

The abundance of fat in human milk, constituting as it does one-fourth of the whole solids, indicates its extreme importance as a constituent in the food of the growing child.

An inquiry into the diet of the rachitic children that have come under my observation supports the views of Dr. Cheadle. Many of them have been fed on diluted condensed milk or other foods in which animal fat and easily digested proteids are conspicuously absent. Several of the children while under treatment have shown an aversion to butter and milk, and inquiry has elicited the fact that those articles of food have formed a very small proportion of their former diet. In support of his views Dr. Cheadle cites the experiments in the feeding of the young animals in the Zoological Gardens, London. A single example will illustrate : It seems that the young animals are extremely liable to become rachitic there. In rearing the young lions, as a rule, the lioness can not be trusted to suckle her cubs ; she either injures them or neglects them and they have to be fed by hand. The food on which they have hitherto been fed, the flesh of old horses, is almost destitute of fat.

The bones were found to be proof against the teeth of the adult lions even, and those of the cubs were powerless to deal with them. Once a week they were given goat's flesh, which is also poorly supplied with fat. This diet would be especially deficient in fats and the earthy phosphates. The feeding of the last litter of lion cubs was commenced in this way : "They quickly developed marked rickets and one died. Then, at the suggestion of Mr. Bland Sutton, the diet was changed. The

meat was continued, but in addition to it cod liver oil and pounded bones were given with milk. No other alteration whatever was made in any way. In three months all signs of rickets had disappeared; and now at eighteen months old, they are perfectly strong and healthy and well developed, a unique event in the history of the Society."

He sums up the general pathology of ordinary rickets thus :

1. It is primarily a diet disease which can be caused at will by a rachitic diet just as certainly as scurvy by a scorbutic diet, and which can be cured as certainly by an anti-rachitic diet as scurvy by anti-scorbutic diet.

2. That the chief defect in diet which causes rickets is want of animal fat.

3. With this probably also deficiency of the earthy salts in form of phosphates.

4. A deficiency of animal proteids in conjunction with the preceding intensifies the condition.

5. The rickety state is accentuated by evil hygienic conditions, such as foul air and want of light, although these are not essential to its production.

6. Rickets is modified in character by the concurrent existence of congenital syphilis and of scurvy.

CHEMISTRY.—Defective calcification of the forming bone is one of the leading features of rachitis. The normal proportion of lime does not enter and cannot remain in the osseous tissue, but is rapidly eliminated by the kidneys and intestinal tract. One hundred parts of bone, according to the analysis of Gorup Besanez, contain :

		OSSEIN.	PHOSPHORIC ACID.	LIME.
Healthy bone	- - - - -	34	26	34
Rachitic femur	- - - - -	72	7	9
Rachitic tibia	- - - - -	60	12.9	17

Thus chemical analysis confirms the experiments of the pathologist.

PATHOLOGICAL HISTOLOGY.—Rachitis is for the most part a disease of the osseous tissue occurring during the period of development of the bones. It is characterized histologically by disturbances of nutrition of the tissues that contribute to the development of the bones. We must then look for the

pathological changes attending this disturbance of a physiological process at the points where the growth of bone occurs, viz., the peritoneum

and the places of apposition between epiphysis and diaphysis.

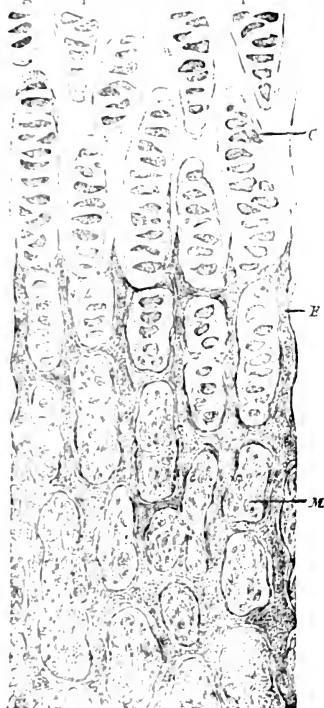


FIG. 1.—HUMERUS OF HUMAN EMBRYO, FIVE MONTHS OLD, SAGITTAL SECTION.—*Heilmann*.

C, Rows of cartilage corpuscles in elongated groups, due to their territories. E, Frame of calcified basis substance, around which, in the lower portion, the first traces of bone-tissue are noticeable. M, Medullary space, containing medullary corpuscles. (Magnified 300 diameters).

Normal Ossification. The long bones are developed from cartilage. The skeleton of the embryo is first formed in cartilage and normal ossification occurs with great regularity. This precursory cartilage may be regarded as a temporary substitute for bone, affording, as it were, a mould of definite figure and form in which the osseous material may be deposited. A section of the bone shaft of a human embryo, at about the fifth month, shows that it is composed of hyaline cartilage, with many medullary spaces. At the point where calcification first commenced the cartilage cells became arranged in regular rows. At this point the basis substance is soon found to be the seat of calcareous deposition. This is beautifully shown in the accompanying drawing (Fig. 1). If we examine minutely a section of

an ossifying bone, it may be observed that the cartilage

cells at a distance from the ossified part are uniformly disseminated in the matrix, but when at or near the points of ossification, the cells are arranged in rows or oblong groups, between which the transparent matrix appears in the form of clear longitudinal lines, obliquely intersecting each other at intervals. At a point lower down it may be observed that this matrix, together with portions of the capsules of the cartilage cells, have become the seat of an earthy deposit.

So that the new calcareous material at first forms oblong areolæ, or loculi, enclosing the groups of cartilage cells. But this process of calcification which differs from that of the true bone formation is only transitory, and a short distance below we see a change taking place in the newly formed tissue. The primary areolæ, above described, open into one another both laterally and longitudinally, and by their coalescence give rise to large secondary or medullary spaces. The primary calcareous plates are all finally absorbed, while the walls of the medullary spaces are thickened by the deposit of layers of new bone. The calcareous deposition occurs only in the broad masses of basis substance, between the region of the cartilage corpuscles, and lower down the spaces are filled with medullary corpuscles. At the lower portion the first traces of new bone can be seen in the form of bright rings attached by their convex surfaces to the calcified frames. This frame work of calcified tissue is soon dissolved and the cartilage cells proliferate, forming medullary cells. True ossification now begins. Some of these cells begin the formation of bone tissue, while others are surrounded by the osseous substance and become bone corpuscles.

Ossification in Rickets. We have seen that in the normal process of ossification the cartilage is reduced to an embryonic condition giving rise to medullary cells. At the same time the formation of new blood vessels occurs. In rickets all this preparatory process is going on at a more rapid rate, but the formation of new bone from the medullary tissue is very scanty or entirely absent.

In a sagittal section of the epiphyseal end of a rachitic bone we notice a zone of an intensely reddish color at the point of transformation of cartilage into medullary tissue. The carti-

lage cells contain a larger amount of bioplasm than normal, the calcification of the cartilage is scanty or absent and occurs in irregular patches. An increased formation of blood vessels occurs. At the peripheral portion of the epiphyseal cartilage a formation of vascularized cartilage, instead of bone can be traced, while the newly formed trabeculae of bone are scanty, irregular in shape and filled with large bone corpuscles. This is well shown in Fig. 2.

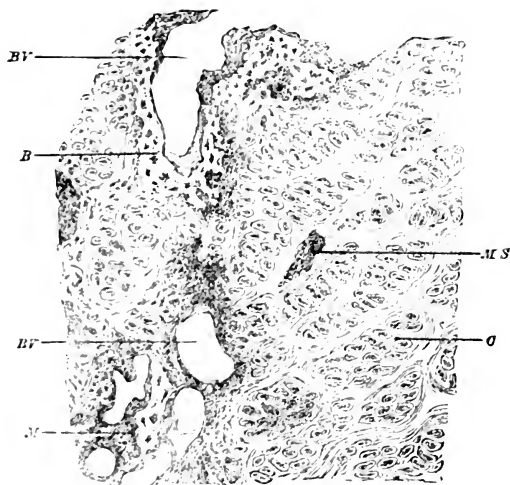


FIG. 2.—RIB OF A RACHITIC CHILD IN TRANSVERSE SECTION.—*Heitzmann.*

C, Cartilage corpuscles arranged in territories. MS, Medullary space sprung from cartilage tissue. M, Medullary tissue with very large blood-vessels, BV. B, a scanty new formation of bone tissue. (Magnified 200 diameters).

At the borders of the bone shaft we find between the thin cortical bone tissue and the fibrous portion of the periosteum a broad layer of medullary tissue. The vascularization of this tissue is so great as to give rise to the appearance of a hemorrhage.

The bone generally remains in a stage of cancellous structure with large irregular spaces.

As Kassowitz well says, lime cannot be deposited in the immediate neighborhood of a copious blood supply. But why does the rachitic process have a special affinity for the growing bone?

Kassowitz urges that the growth of bone differs from all other tissues, in that the latter grow uniformly throughout their whole mass, that the circulation in them is more uniform and carries nutrition into and through every particle simultaneously, while in the bones the only places in which the whole circulation can contribute to their growth are the epiphyseal cartilage, periosteum and marrow. Every morbid irritation, whether resulting from bad air, food and habitation, or from acute or chronic ailment, acts on the whole mass of other tissues or organs, but in the bones only on the growing ends or surface. During the active progress of this disease the bones can be bent by the least possible force and their spongy portions can be easily cut with a knife.

The ligaments are often altered in their structure and become relaxed. This is shown in the yielding spine and the relaxed bone and ankle joints. If the bone deformities remain uncorrected, their relaxation exists even until late in life. In one case, which has come under the author's observation, a condition of bow legs still existing in a man 50 years of age is associated with marked relaxation of the crucial and lateral ligaments, apparently due in part to an effort of the patient to overcome the genu varum by a still further stretching of the internal lateral ligament. However profound may have been the pathological changes in the bones, as soon as the tissues become properly nourished and the child commences to recover from the disease, the bone cells rapidly take up calcareous matter from the blood and dense bone is formed producing the condition called eburnation or sclerosis. Rachitic changes in the osseous tissue do not affect all the bones of the skeleton in equal degree, or even the different portions of any individual bone to the same extent. The bones of one limb may be quite hard, while the other is soft, or the softening may be more marked in the shaft than in the epiphysis or *vice versa*. In

operating, I have often noticed that the bone of one limb was softer than that of the other.

Macewen claims that different deformities may be explained by this irregularity in the portion of the bone on which the intensity of the rachitic process falls. Rachitis is not usually developed after the age of five years, although Macewen believes that it may be developed even up to the twentieth year of age, especially after the exanthemata or other debilitating disease.

I have not met with cases of this character.

Rindfleisch thus describes the manner in which the deformities occur: "The bones bend, or what is just as common, they break on one side like a roll of paper, while the other side is simply stretched across the seat of fracture and the central marrow is crushed." (Green stick fracture.)

Rickets being assumed as the general and common predisposing cause of these deformities, what is the element, or the direct and determining cause of the deformity?

The theory that the deformities are the result of muscular action cannot be supported by facts. As pointed out by Ogston, the normal shape of the bones is produced, not so much by forces within themselves, as by the action on them of normally acting muscles and such like external agents. It should be remarked that the inferior extremities are more curved than the superior, a fact which did not escape the observation of Glisson. This fact can only be explained by their position and that they support the weight of the body. It has been observed that children who are confined to bed during the acute stage of rickets, and in whom the weight of the body is prevented from being thrown on the lower limbs until the bones are firm, are not the subjects of these curves. Again, those persons whose occupation compels them to stand much of the time on their feet are frequent subjects of such deformities, so much so that the German vernacular for knock-knee is *Bäckerbein* (baker's legs).

The causes determining the special deformity in any given case are various. The intensity of the rachitic process in any particular portion of the bone affected, and the age of the person affected. The more intense the action and the younger the person, the greater will be the number of curves.

The tibial curves belong to the first two or three years of life. If the shafts of the bones are more affected than their extremities, one would expect bow-legs and not knock-knees; if, on the other hand the distal extremities of the femur are more affected and the shafts less we would expect genu valgum as a result. The particular manner in which the weight of the body is directed on the bones, whether the child walks, creeps, sits or shuffles along the floor, each has its effect.

Attention has not been drawn to the fact that in crawling along the floor the weight of the body is thrown on the knees and inner sides of the malleoli, thus tending to produce genu valgum. It should also be remembered that the deformities are frequently but exaggerations of normal curves. Prof. Fischer has drawn attention to the fact that all organs during their growth assume a spiral shape, something like a corkscrew, and that the spiral curve always takes a definite direction, right or left, according to their anatomical relation to a central axis. Many deformities he attributes directly to an increase or diminution of normal spiral curves, as for instance, scoliosis and genu valgum and varum.

SURGICAL TREATMENT OF RACHITIC DEFORMITIES.—While it is true that every case of knock-knee or bow-legs does not demand surgical interference, yet spontaneous cures with rectification of the deformities are exceedingly rare.

While the bones are soft, orthopædic apparatus may be of benefit, but after eburnation has taken place or even become well advanced, it is worthless.

The importance of the early recognition and the early treatment of bow leg and knock knee deformities can not be too strongly emphasized. Although there may be a slight improvement in the deformity, corresponding with a general improvement in the health and nutrition of the individual, yet the expectation of a perfect cure by unaided nature will most frequently end in disappointment.

Far better results, in a shorter space of time, with much less suffering, can be obtained by judicious surgical interference. I fully agree with Roberts that "the surgeon who assumes the responsibility of giving advice or administering treatment in these cases should never be content short of a result which

will enable the patient to advantageously receive the weight upon his legs when in the erect posture. The prime function of bone is to sustain weight. If the relationships of the long bones of the lower extremities are not such as will permit of their receiving advantageously the entire weight of the body, an undue strain on the soft parts is inevitable, and sooner or later discomfort or suffering will, as a rule, result. The pain and discomfort which result from the continuance in adolescent and adult life of even a slight amount of deformity is often very great. Especially is this the case if, with increased years, there is a proportionately greater increase of weight of body." A reason for this belief is the frequency of adult cases of deformity seen on our streets. I have frequently counted as many as 10 to 15 in a few hours' walk.

In Glasgow, notwithstanding the enormous work of Macewen and other surgeons, an equal number of cases may be counted in a walk of a few minutes, showing conclusively that many cases never become corrected spontaneously.

"Osteotomy," says Macewen, "in its broadest acceptation may be defined as a section of a bone.

"It has, however, been regarded in a much more restricted sense, the term being applied to such divisions of bones as have been proposed and undertaken for the relief of deformity, for the rectification of badly united fractures and for the straightening of limbs affected with osseous ankylosis, which are fixed in a bad position." (*Osteotomy*).

The first osteotomy for the rectification of ankylosis was performed by Dr. John Rhea Barton in 1826. Langenbeck, in 1852, made a division of the femur for ankylosis of the hip joint by perforating the bone with a drill through a small wound in the soft parts, and then divided the bone with a narrow saw. To this operation he gave the name of subcutaneous osteotomy.

In 1875, Volkmann, of Halle, operated antiseptically on two cases of ankylosis of the knee-joint, and in the same year Macewen performed a similar operation. These two influences, the introduction of Listerism and the subcutaneous method of Langenbeck have made osteotomy one of the safest operations in surgery. Without the advent of antisep-

ticism osteotomy would have remained an operation confined to the few, or would have entirely receded from the field of surgery. The honor of introducing antiseptics into osteotomy is due to the distinguished Volkmann, of Halle.

Various instruments have been employed for the performance of osteotomy, including trephines, bone perforators, gimlets, chain saws, round saws, ordinary saws, trocar saws, and electric saws, some for subcutaneous and others for open wounds; the last and best of all is the chisel. There are two forms, in one the edge is beveled, as in the ordinary carpenter's chisel; in the other the blade has the shape of an elongated inclined plane, and to this Macewen has given the

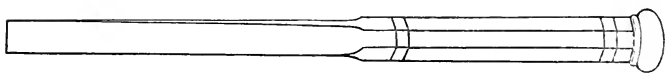


FIG. 3.—MACEWEN'S OSTEOTOME.

name "Osteotome" in order to distinguish it from the chisel proper. (Fig. 3).

The osteoclast is an instrument of tremendous and brutal power which I hope will never be generally adopted by American surgeons. As some one well puts it, "the osteoclast should become an historical surgical reminiscence; while Macewen's chisel should be canonized as the ideal scientific corrector of bone deformities."

Osteotomy may be either linear or cuneiform. A section of bone by *linear osteotomy* is made through a small wound just large enough to admit the osteotome. The bistoury should be maintained in situ to serve as a guide to the osteotome which is inserted at its side.

The osteotome is introduced in a line with the incision in the soft parts; when it reaches the bone it is turned to the direction that the osseous incision is to be made. In selecting a site for the incision in the soft parts, it should be made so as to avoid wounding any of the larger blood-vessels. In the hand of the expert operator the osteotome becomes a probe and the sensations conveyed through the instrument enable him to

ascertain all that could be known by the introduction of the finger. The osteotome should be directed so as to cut away from any important structures that lie close to the bone. At the same time, the sides of the instrument being blunt, it may be used so as to turn aside the soft tissues, meanwhile keeping the cutting edge in contact with the bone. The osteotome is driven through the bone by pretty firm blows with the mallet. For this purpose I am in the habit of using a good sized carpenter's mallet. After each blow the instrument is moved from side to side at right angles to the bone, in order to prevent its becoming too firmly wedged in the bone. In dividing large bones it is well to use in succession osteotomes of two or three sizes. Section of the bone should be commenced with the largest osteotome. After a time the instrument becomes wedged and is difficult to move. It should then be withdrawn and the next smaller size substituted. A section thus made is more V-shaped. In performing cuneiform osteotomy a large open wound must be made and the operation is not subcutaneous. In performing either subcutaneous or cuneiform osteotomy strict antiseptic precaution should be observed; by this means we secure perfect immunity from inflammatory complication and a compound fracture heals as a simple fracture.

The patient should be profoundly narcotized before commencing the operation, as any movement of the limb produced by muscular contraction might disturb the relation of the knife or chisel to the bone and wound some structure not intended to be disturbed. The limb should then be rendered bloodless by means of an Esmarch's bandage. The limb should be thoroughly cleansed by means of soap, water and brush, shaved and then washed with ether in order to remove all fatty and sebaceous substance. It is then wrapped in a towel wet in a 1-1000 corrosive sublimate solution until ready for the incision. Having selected the site of the incision the bone should be reached as quickly as possible, by a sharp, clean incision, produced by a single stroke of the knife. Other things being equal, the line of incision should be parallel to the fibres of the muscles penetrated. Commencing with the largest and using the other sizes in succession, the incision thus made

corresponds more nearly to a wedge. Under no circumstances should the osteotome be used as a lever to pry the bone apart as it will result in the breaking of the instrument.

The instrument should be grasped firmly in the left hand, the border of which rests on the limb, just above the wound. In this way the osteotome is under perfect control and any deviation which might inadvertently be given to it by the mallet can be instantly checked. (See Fig. 4). The chisel should be

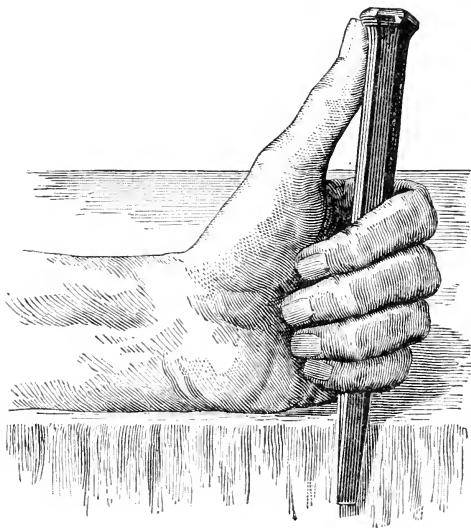


FIG. 4.—MANNER OF HOLDING THE OSTEOTOME.

made to traverse the deeper layers of bone in a fan-like manner. When the section of the bone is nearly completed the osteotome is withdrawn and the deformity rectified by fracturing with the hands the remaining bridge of bone. During the section the wound should be kept wet with $\frac{1}{2000}$ sublimate solution, or if there is any reason to fear that the antiseptics have not been perfect, on the removal of the osteotome, the small nozzle of an irrigator may be introduced and the wound irri-

gated with the sublimate solution. After the deformity has been corrected a wet sponge is secured over the wounds with a few turns of a roller bandage and the Esmarch bandage removed.

The sponge should remain in place while the other limb is being operated upon, or until the limb is ready to be dressed.

The hæmorrhage after a subcutaneous osteotomy is slight, I have never seen enough to cause any anxiety.

Cuneiform Osteotomy. In anterior curvature of the tibiæ and angular curvatures of the long bones a wedge of bone has to be removed in order to correct the deformity. For this purpose a chisel with a straight cutting edge on one side is used and the section is made through an open wound.

An Esmarch's bandage having been applied an incision is made over the crest of the tibia, parallel to the long axis of the limb directly down to the bone at the site of the greater curvature. The wound should be large enough to admit the finger and to enable the operator to see what he is doing. I have sometimes made the incision at right angles to the axis of the limb. While this facilitates the operation the hæmorrhage is apt to be greater. The periosteum should be divided in the same line with the incision through the soft parts.

It is sometimes recommended to make another incision at right angles to the first at its middle portions. This complicates the wound and is of no material advantage. The periosteum should be well separated from the bone at the point where the wedge is to be removed. The size of the wedge that it is necessary to remove should be accurately determined before the operation, and marked off with a pair of calipers. When a large wedge is to be removed it is better to cut it out in several small pieces, first a small superficial wedge, then a shaving on each side until the desired amount of bone is cut out. The shape of the normal bone does not afford a guide in the removal of the wedge, as the shape of the distorted bone is greatly altered in its contour.

The deformed tibia will often be found greatly flattened from side to side. If the chisel be kept within the periosteum important soft structures cannot be injured. If the size of the wedge has been accurately calculated, when the deformity

is corrected the cut surface of bone will just come in apposition and may be held in position with a suture of strong catgut.

Dressing of the Wound. After the circulation has been established, any bleeding vessels that are liable to cause trouble are to be secured with catgut ligatures. The edges of the periosteum are to be united with catgut sutures, a few strands of catgut placed at the angles of the wound for drainage, and the skin united. It has been sometimes recommended that a counter opening be made at the apex of the wedge and several horsehair-drains inserted.

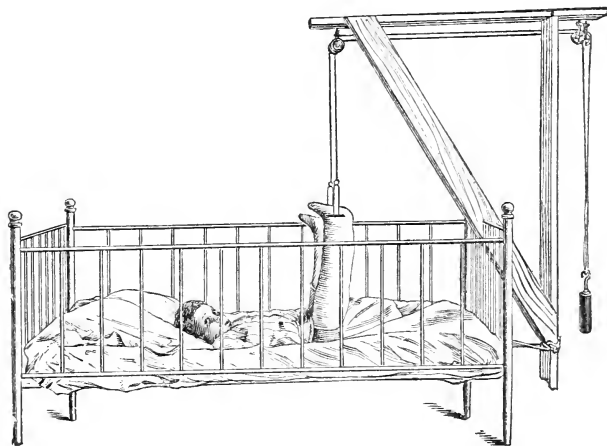


FIG. 5.—THE AUTHOR'S METHOD OF SUSPENDING THE LIMB AFTER OSTEOTOMY.

Macewen treats the wound openly. The wound should be dusted with iodoform and covered with a strip of Lister's protective. The limb is then enveloped in a mass of sublimate gauze and absorbent cotton and neatly bandaged. After both limbs are dressed a plaster bandage is applied and the limb is suspended, as in Fig. 5, a method which I have found of exceedingly great advantage in my practice.

Macewen uses a splint consisting of a back, an outside and foot piece (Fig. 6), the padding being arranged so as to slightly over-correct the deformity. The essentials for success are the maintenance of the limb in a fixed straight position and the keeping the body at rest. I think these requirements may be more easily accomplished by the position which I suggest. The wound heals by first intention. The wound may be left for three weeks when the dressing should be removed and any slight remaining deformity corrected and the wound dressed for another three weeks. I believe, however, that the best results can be secured by placing the limb in a temporary splint for 24 hours when the dressing is removed and the limb put up in a permanent dressing and splint.

It is often found that the first dressing becomes saturated and hardened by the dried blood and loses its antiseptic properties.



FIG. 6.—MACEWEN'S SPLINT.

Cases Suitable for Operation. Genu valgum or knock-knee may be defined as a deformity at the knee-joint in which a line drawn from the head of the femur to the middle of the ankle-joint passes outside the center of the knee-joints and in which the internal malleoli cannot be made to touch when the limbs are in an extended position.

Several different operations have been performed for the relief of genu valgum. The one which I think gives the best results is that of Macewen.

In performing this operation the incision in the soft parts is made on the inner side of the limb, at a point where the two following lines bisect one another; a line drawn a finger's breadth above the level of the upper border of the external condyle and in a line parallel to, and half an inch in front of

the tendon of the adductor magnus. By making the incision directly down to the bone it is impossible to wound any important structures.

In July last I had the opportunity of seeing that master of osteotomy, Dr. Macewen, perform his celebrated operation for genu valgum. A small quick incision, with a few rapid strokes of the mallet, the chisel divided the superficial shell of the inner surface of the femur, then the chisel was rapidly driven in a fan-shaped direction into the cancellous tissue of the bone and the division completed. The other limb was likewise operated upon with the same degree of rapidity and precision. The deformities were at once corrected, the limbs dressed and immobilized in a splint.

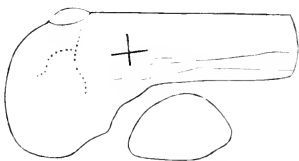


FIG. 7.—DIAGRAM SHOWING POINT WHERE THE FEMUR IS DIVIDED IN MACEWEN'S OPERATION.

Curvatures of the tibia may be lateral, anterior or antero-lateral; the bending may be confined to the lower third of the bone, just above the malleoli, it may involve the whole bone, or there may be a short curvature at its lower third and then a long one above, or the bone may have one long anterior curve. An anterior curve above the ankle and a compensatory posterior curve just below the knee is a frequent deformity. This deformity frequently gives rise to a condition of hyperextension at the knee-joint.

In these cases when the deformity is slight it may be corrected by a simple osteotomy, but when the deformity is pronounced, a series of osteotomies, or the removal of several wedges is necessary to rectify them. In one case I performed, as many as eighteen sections of bone on one patient.

In well marked cases of anterior curvature after removal of the wedge of bone it will be found that the deformity cannot be overcome until the tendo Achilles is divided subcutaneously.

I have had to perform tenotomy of the tendo Achilles in four cases. Out of a series of one hundred and fifty-eight sections of bone, in only two cases, in which cuneiform oste-

otomy was performed, the skin wound failed to unite owing to pressure of the splint, but in none of the cases has there been suppuration or non-union.

I append herewith abstracts of seventeen cases in illustration of the views presented.

CASE I.—Lena H., *æt.* 12 years. History of rachitis. Marked genu valgum. When standing with the internal condyles of the femur touching, the feet were separated a distance of twenty inches.

Jan. 8, 1885, supracondyloid osteotomy of both femora. Recovery attended by no bad symptom; in three week's the dressings were removed and the wounds found to be healed and the limbs in good position. At the end of the 7th week the patient was walking about.

CASE II.—Ruby H., *æt.* 8 years, sister of Case 1. Has marked genu valgum of rachitic origin, in both limbs. When standing the feet were separated a distance of 22 inches.

Jan. 8th., supracondyloid osteotomy of both femora. Antiseptic dressing, plaster splints and suspension. Made an easy recovery. Redressed at the end of 3 weeks; wounds healed; limbs in good position.

CASE III.—James H., *æt.* 10 years. All the bones presented slight rachitic changes. In the forearm there was a marked posterior curvature of the ulna and radius.

On Feb. 5th I performed subcutaneous osteotomy on both the ulna and radius, the limb was rectified and dressed with a plaster splint which was changed at the end of three weeks, when the wounds were healed; plaster re-applied for another two weeks.

These three cases belonged to the same family. The mother has had seven children, all of whom are rachitic.

CASE IV.—Eighteen sections of bone. Jane S., *æt.* 9 years, entered the hospital in April, 1886. She was in a poorly nourished condition, and presented marked rachitic deformities of all the long bones.

The femora present anterior and lateral curvatures with great depression of the internal condyles.

Below the knee, in both legs, there is a marked posterior curvature with outward rotation of both tibiæ and fibulæ. About the middle portion of each leg there is a marked anterior and inward angular deformity of both bones of the leg. Just above the ankle there is marked anterior curvature of both limbs.

On April 24th I performed cuneiform osteotomy on tibiæ and fibulæ of both legs for the correction of the most marked deformities. The

limbs were immediately put up in plaster splints; these were not removed for a period of three weeks.

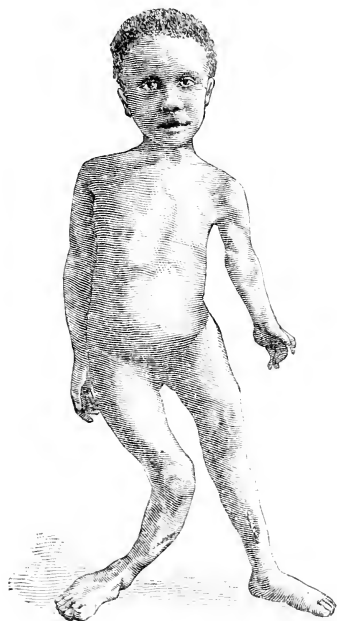


FIG. 8.—MULTIPLE RACHITIC DEFORMITY AFTER PARTIAL CORRECTION. From a photograph of Case iv.

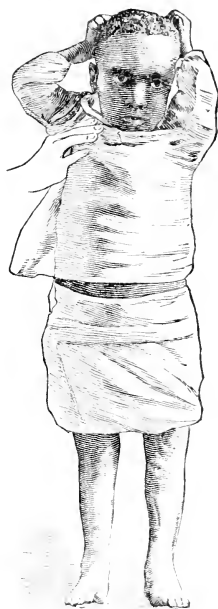


FIG. 9.—MULTIPLE RACHITIC DEFORMITY AFTER COMPLETE CORRECTION. From a photograph of Case iv.

When the wounds were found to be healed and the worst deformity corrected, the plaster splints were re-applied for another three weeks, when they were removed and the patient was allowed to walk around. Fig. 9 shows the patient after these four osteotomies. Previous to the operation, on walking, the inner portion of the leg touched the ground.

Oct. 6 I performed Macewen's supracondyloid operation on both femora. Nov. 20th, cuneiform osteotomy on both tibiæ and fibulæ. Dec. 28th, cuneiform osteotomy of right lower tibia and fibula.

From all of these operations the patient has recovered without the least trouble, and there has not been a particle of suppuration in either wound. May 8, 1887, cuneiform osteotomy of tibiae and fibulae above ankle. June 2, cuneiform osteotomy of upper left tibia and fibula. Oct. 12, cuneiform osteotomy, right tibia and fibula. Fig 9 shows the patient in her present state; she is able to walk with ease and comfort and feels proud and happy.



FIG. 10.—CASE OF BOW LEGS. From a photograph of Case viii.



FIG. 11.—CASE OF BOW LEGS CORRECTED. From a photograph of Case viii.

CASE V.—Samuel C., *æt.* 9 years, presents a well marked example of rachitic deformity. The teeth are deficient. The femora have an anterior curvature and both internal condyles are much depressed.

The tibiae present several marked lateral and antero-posterior curvatures.

He walks with difficulty. There is also well marked lordosis. On July 12th I performed Macewen's operation on both femora. Dressed as usual.

Wounds found healed when the dressings were removed at the end of three weeks. Oct. 3d I performed cuneiform osteotomy on both tibiæ and fibulæ just above the ankle, for marked lateral curvature

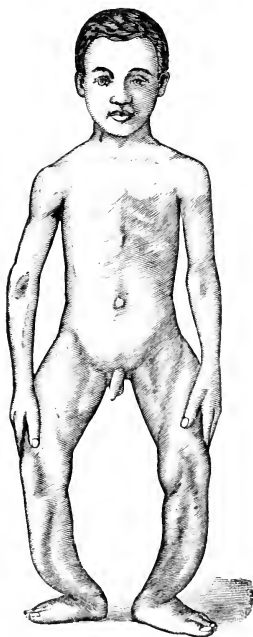


FIG. 12.—ANTERIOR VIEW OF MULTIPLE DEFORMITY. From a photograph of Case xii.

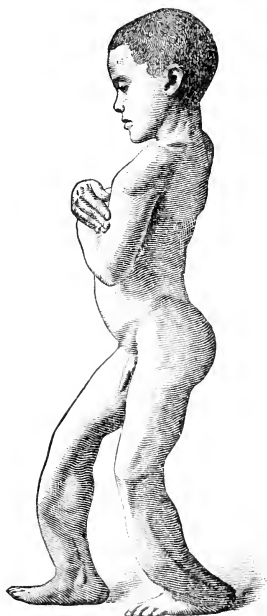


FIG. 13.—LATERAL VIEW OF MULTIPLE DEFORMITY. From a photograph of Case xii.

Nov. 3 dressings removed, wounds healed. A month later the tibiæ and fibulæ above were operated upon for antero-posterior curvature.

CASE VI.—Lena F., æt. 3 years, was admitted Sept. 5th. She pre-

sented a well marked example of bow legs. Subcutaneous section of tibiae and fibulae of both legs at the upper portion was performed Oct. 5. Recovery normal.



FIG. 14.—CASE OF MULTIPLE
DEFORMITY CORRECTED.
From a photograph of
Case viii.

CASE VII.—Frank P., *æt.* 8 years, presented a well marked example of genu valgum. On Oct. 7 I performed Macewen's operation on both femora; recovered without incident, splint removed at the end of five weeks.

CASE VIII.—Lillie D., *æt.* 3 years. Well marked example of bow legs, had been treated mechanically at one of the Brooklyn orthopaedic dispensaries for over a year but without material benefit.

Nov. 18th, 1886, I performed osteotomy on both legs, dividing the tibiae and fibulae. She made an uninterrupted recovery. Patient before and after operation is shown in Figs. 10 and 11.

CASE IX.—James Lowery, *æt.* 4 years, was admitted into the hospital with a marked curvature of both bones of the legs, especially prominent just above the ankles and below the tibial tuberosities. On Nov. 27, I made a section of the fibulae and tibiae of both legs.

The deformities at these points were corrected but a slight angular deformity remained just above the ankle of the left leg. The parents were, however, so well satisfied with the result of this operation that they did not consider another operation necessary.

CASE X.—Edna F., *æt.* 3 years. Entered the hospital March 2nd. An example of genu valgum. Macewen's operation April 14th. Splints were removed at the end of five weeks, when the limbs were found to be in good condition.

CASE XI.—Anna B., *æt.* 3 years. Entered the hospital May 16th. Outward curvature of the legs. Cuneiform osteotomy May 19th. Recovery uninterrupted.

CASE XII.—Frederick M., æt. 10 years. History of rachitis. All the bones presented marked evidence of rachitis. Teeth deficient and all the long bones deformed. The femora presented anterior and lateral curvatures with depression of internal condyles.



FIG. 15.—CASE OF MARKED GENU VALGUM.
From a photograph of Case xiv.

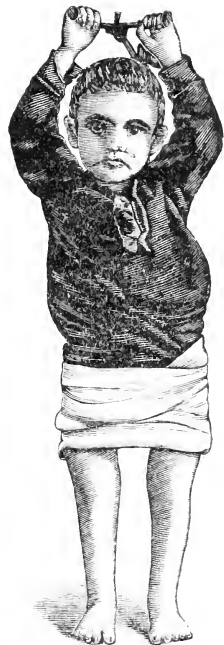


FIG. 16.—CASE OF MARKED GENU VALGUM CORRECTED.
From a photograph of
Case xiv.

The tibiæ were flattened with anterior and lateral curvatures. Cuneiform osteotomy of both tibiæ and fibulæ May 18th, 1887, with correction of angular curvatures above ankle. In order to straighten the limbs I had to tenotomize both tendones Achillis.

Wounds healed without suppuration.

Oct. 13th. Macewen's operation for the correction of genu valgum.
Nov. 15th, cuneiform osteotomy for correction of anterior curvatures of tibiæ.

Patient discharged Dec. 30, with limbs in good position. Figs. 12, 13 and 14 illustrate his condition at different stages.

CASE XIII.—Brunetto C., æt. 4 years. Entered June 10th. Compound rachitic deformity. Cuneiform osteotomy of tibiæ and fibulæ of both legs June 30th.

Oct. 25th. Macewen's operation. Recovery.

CASE XIV.—John Binca, æt. 4 years, was admitted August 14. His condition at that time is shown in Fig. 15. On Oct. 18 I performed Macewen's operation on the femur. The result is shown in Fig. 16. Jan. 4, 1888, I performed double cuneiform osteotomy on tibia and fibula of left leg. On Jan. 25 I performed similar operation on the right leg. April 6, cuneiform osteotomy of both tibiæ and fibulæ for posterior curvature.

CASE XV.—Harry B., æt. 7 years, entered Oct. 19. He presented marked genu valgum and tibial curvature. Nov. 11, supracondyloid osteotomy. Jan. 25, 1888, I made cuneiform section of upper tibiæ and fibulæ of both legs, after the manner of Volkmann, for correction of some remaining genu valgum and posterior curvature of tibiæ.

April 12, cuneiform osteotomy of bones of both legs.

CASE XVI.—Bessie L., æt. 5 years. When 2 years old was treated for muscular debility and infantile paralysis. Supracondyloid osteotomy Oct. 20.

CASE XVII.—Lucy N., æt. 6 years. Rachitic history, marked rachitic deformity of legs.

Nov. 5, supracondyloid osteotomy. Jan. 24, cuneiform osteotomy of both tibiæ and fibulæ for anterior curvature above ankle.

April 30, cuneiform osteotomy of both tibiæ and fibulæ at the upper part for posterior curvature.

CASE XVIII.—James M., æt. 4 years. Rachitic history. Complicated deformity of legs.

Nov. 11, I performed supracondyloid osteotomy on both femora. Jan. 24, cuneiform osteotomy of both tibiæ and fibulæ for anterior curvature.

April 30, cuneiform osteotomy of both tibiæ and fibulæ at upper third.

CASE XIX.—Carrie —, æt. 7 years. Rachitic history. Deformity well marked in tibiæ and fibulæ. Illustrated in Figs. 17 and 18.

Feb. 3, I removed a large wedge from both tibiæ and fibulæ for

correction of anterior and lateral curvature. In order to fully correct the deformity I had to tenotomize both tendones Achillis.

April 14, cuneiform osteotomy of tibiæ and fibulæ at upper third for anterior curvature.



FIG. 17.—RACHITIC DEFORMITY OF UNUSUAL TYPE. From a photograph of Case xix.

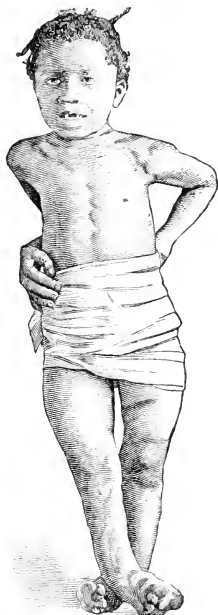


FIG. 18.—TYPICAL CONDITION OF TEETH IN RACHITIS. From a photograph of Case xix.

CASE XX.—Lizzie B., æt. 7 years. Rachitic history; different portions of the body presented marked deformities of a rachitic nature. The head was markedly elongated antero-posteriorly and flattened from side to side. Fig. 19. The upper and lower extremities presented various deformities of a complex nature.

Feb. 26, double cuneiform osteotomy of both legs above the ankle for anterior and lateral curvature.

April 25, double supracondyloid osteotomy.

June 20, section of both ulnæ and radii for posterior curvature.

CASE XXI.—Charles F., æt. 7 years, presented a very aggravated type of rachitic deformity.

Feb. 25, double cuniform osteotomy at the lower third of the legs for marked angular deformity.

The operation of double osteotomy by the supracondyloid method was done April 28.



FIG. 19.—MULTIPLE RACHITIC DEFORMITY, SHOWING ELONGATED HEAD.
From a photograph of Case xx.



FIG. 20.—GENU VALGUM EXISTING IN A BOY ÆT. 15 YEARS From a photograph of Case xxvi.

June 29th, section of both ulnæ and radiæ for marked curve in the forearm. Recovery from these several operations was perfect.

CASE XXII.—Elizabeth J., æt. 12 years. Genu valgum with anterior curvature of tibiæ.

April 24, supracondyloid osteotomy.

June 19, section of both tibiæ and fibulæ.

Deformity corrected.

CASE XXIII.—Posquet Sarronto, born of Italian parents, æt. 5 years. Rachitic history. Genu valgum. Mallorli separated ten inches; posterior curvature of tibiæ, Rachitic spine.

Jan. 4, supracondyloid osteotomy.

April 20, cuneiform osteotomy of both tibiæ and fibulæ. Plaster dressing. Recovery normal.

CASE XXIV.—Wm. D. æt. 5 years, typical form of genu varum. Sept. 6, section of tibia and fibula of each leg at two points. Deformity corrected; antiseptic dressing and plaster splint.

Dressings and splints removed at the end of eight weeks.

CASE XXV.—Tommy Fisman, æt. 5 years, exaggerated form of bow legs of marked degree. Sept. 10, section of both tibiæ and fibulæ at the upper and lower angles of the curvature. Antiseptic dressing and plaster suspension. Dressing removed at the end of eight weeks, wound healed and deformity corrected.

CASE XXVI.—Wm. J. æt. 12 years, a typical example of genu valgum, malleoli separated twenty inches. Fig. 20. Jan. 20, supracondyloid osteotomy. Plaster dressing and suspension. Temperature normal.

CASE XXVII.—R. M. æt. 4 years, genu valgum. Dec. 2, supra-condyloid osteotomy. Plaster dressing and suspension. Dressing removed at the end of the seventh week.

A CASE OF SPONTANEOUS FRACTURE OF A VESICAL CALCULUS.¹

By H. P. SYMONDS, F.R.C.S., Edin.,

OF OXFORD,

SURGEON TO THE RADCLIFFE INFIRMARY.

A MALE, street-singer, W. B., æt. 16, was admitted to the Radcliffe Infirmary under the care of one of the physicians on the 17th of August, 1888. He complained of incontinence of urine and great pain and tenderness over the left kidney. The boy was much emaciated, had no appetite and suffered much from nausea. He had absolute incontinence of urine.

On August the 23rd, I was asked to see the patient; it was, of course, necessary to sound the bladder for purposes of diagnosis. As the patient was very nervous and bore pain badly, I decided not to do so then and there, but to have him taken to the operating theatre on the following day, and then to sound and generally complete the diagnosis under an anæsthetic, being prepared to operate in any manner suggested by the result of the examination. On introducing the sound, I discovered a urethral calculus about 4 or 5 inches from the meatus. I seized it with urethral forceps, but as there was considerable difficulty in withdrawing it, I cut upon it in the perineum and removed it through the incision. A rectangular staff was then passed into the bladder and several calculi were felt.

The perineal incision was continued on into the bladder and enlarged somewhat in a lateral direction, to give more room for the withdrawal of the stones. Five calculi, or rather, fragments of one calculus were then removed with some little difficulty.

August 25th. The boy slept fairly last night, and his general condition is much improved. Since the operation he has made steady progress; at this time, October 10th, he has absolute control over his

The report of this interesting case is due to Mr. F. S. ARNOLD, M.A., M.B. Oxon., M.R.C.S., Eng.

urine, which all passes per urethram. He sleeps and eats well, the tenderness over the left kidney, which was a marked symptom on his admission, has completely disappeared. The urine still contains some pus and albumen.

The chief interest in this case lies in the fact that it is an instance of a somewhat rare condition, viz., spontaneous fracture of a vesical calculus. It was obvious on a first glance at the stones as they were removed, that they were all fragments of one calculus. It was one of these fragments which had become impacted in the boy's urethra and given rise to the incontinence of urine. The six fragments, when fitted together, did not quite constitute the whole calculus; there was a small piece missing, which had, in all probability, been passed per urethram before admission. The fracture had evidently occurred some time back, as the larger fragments were water worn and the fractured surfaces smooth polished.

The combined weight of the six fragments is 322 grains. The stone has a phosphatic interior with an envelope of calcium oxalate; the composition of the stone is interesting as all the cases of spontaneous fracture hitherto recorded have occurred in uric acid calculi.

Several theories have been broached to account for the spontaneous fracture of a vesical calculus.

Civiale suggested that it might be due to the pressure of a hypertrophied bladder; it has also been supposed that the concussion of one stone against another might be the cause in cases where the fragments represented more than one original calculus. Neither of these theories have any evidence to support them.

Dr. Ord, of St. Thomas's Hospital, who has taken much interest in this subject, and has collected the records of a considerable number of cases, points out¹ that in many of these cases the nucleus of the stone is wanting, and theorises as follows: "If you will compare the two sets of fragments now exhibited, with those described in my former lecture, you will, I think, have no hesitation in recognizing a strong family like-

¹*Brit. Med. Journal*, 1878, Vol. 2, p. 347.

ness between the three. All are segmentary fragments of pisiform calculi, composed of either uric acid or acid urate of ammonia, in all the nucleus is wanting, in many specimens of all three groups indications are afforded, in the presence of an investing layer of mere alkaline material, of a change in the reaction of the urine immediately after, if not at the very time of, disruption. I maintain, therefore, that in a changed state of the urine the nucleus had become swollen and had acted as a bursting charge in a shell."

Another theory ascribes the fracture to growth of a minute fungus, allied to, if not identical with, the *penicillium glaucum*.

It is obvious that Dr. Ord's theory does not hold good in regard to this case; in the first place the nucleus is intact, the fracture consisting of a mere splitting off of part of the envelope; secondly the chemical composition of the stone is entirely different from that of the calculi from which Dr. Ord drew his theory.

Mr. Willson, dispenser to this Hospital, has suggested that in this stone the fracture may have been due to change on the part of the calcium oxalate from the amorphous to the crystalline state.

In Erichsen's *Science and Art of Surgery* the theory is advanced that these calculi are usually of irregular shape and bossed on the surface, and that some phosphatic material becomes deposited in these irregularities, and so levers off a portion of the laminated deposit. In this case I am inclined to the last theory.

The specimen is now in the Royal College of Surgeons' Museum.

MAMMILLAPLASTY.

By W. L. AXFORD, M. D.,

OF CHICAGO.

TO an operation for the restoration of deeply depressed and useless nipples I have taken the liberty to give the name mammillaplasty ; an operation which, so far as my familiarity with surgical literature goes, has never been practiced in the manner here described.

That surgical measures have not been commonly applied to the relief of this condition is undoubtedly due to the fact that the retracted nipples of the healthy breast can usually be so drawn out by mechanical devices as to serve the purpose for which they were intended. The following case, however, will show that there is a field, though a very limited one, for the intervention of the surgeon ; a field which should in all cases lie beyond the line of failure of all mechanical devices.

Mrs. H., a young German woman about three months advanced in her third pregnancy, was referred to me by Dr. F. B. Norcom, who wished to see if I could do anything for her badly retracted nipples. In her two preceding lactations she had not been able to nurse her children, though all known mechanical devices had been resorted to. The only relief for the woman was to suppress the milk as soon as possible. She was very anxious to nurse the expected child. Dr. Norcom informed me that some ten years ago he had succeeded in improving a depressed nipple by excising an elliptical piece of skin and drawing the edges of the wound together, and that, although this case was much more unfavorable, he believed an operation feasible. The idea was to me entirely new, nor could we find any literature bearing on the subject.

On examination it was found that where there should have been a projecting nipple there was actually a depression into which the end of the little finger could be inserted. The breasts were perfectly

healthy and otherwise well formed. The woman was a brunette and the depressed nipple in its dark areola presented much the appearance of the invaginated finger of a dark brown kid glove. The right breast was deeper than the other.

Seizing the orifice of the ducts with toothed forceps, the nipple could be easily drawn out to any reasonable extent. There were no adhesions or bands holding it down. An operation was proposed and accepted which, with the assistance of Drs. Norcom and Parsons, was done as follows: The right nipple was seized with the volsella and drawn out till the skin was well on the stretch; beginning about one-third of an inch from the apex two curved incisions enclosing a lune shaped piece of skin were extended out in the breast for two and a half inches, and the skin and fat down to the fascia removed.

This area of denudation should have its greatest breadth at the base of the newly formed nipple. Three such lunes radiating from the nipple were made. A catgut suture was now passed in and out, purse-string fashion, through the fascia, encircling the base of the nipple, and snugly tied at the point of entrance. This served to pucker up the fascia so that when the volsella was removed the nipple showed no tendency to return to its inverted condition. This suture becomes completely buried when the denuded areas are closed. These areas were now closed with the continuous silk suture.

The result in the right and more depressed nipple was so satisfactory that we decided to attempt the other. A similar operation was done, the lunes a little broader and the buried sutures a little deeper, with a much more satisfactory result. An antiseptic dressing was applied and the patient put to bed. The sutures were removed at the end of the seventh day and the immediate result found to be excellent.

The anatomical construction of the breast furnishes the key to the operation. The fascia every where covering the surface of the gland protects the lactiferous ducts from injury and when puckered up around the base of the well drawn out nipple forms a support for the soft yielding tissues of which it is composed, holding it out in its proper place. In both cases after tying the buried suture the nipples stood out without the aid of the forceps. The closure of the lune-shaped areas in turn furnishes an additional support to that given by the puckered fascia and adds to the projection of the nipple.

If it is found that the effect of the catgut suture is not great enough, or is not permanent owing to its early absorption, a second catgut suture, larger and deeper, may be placed; or a heavy silk suture may be introduced from the skin, so that the knot may not be buried and left till a fair amount of suppuration occurs along its course. After its withdrawal the contraction of the circle of inflammation which has formed would in all probability give sufficient support.

I am much indebted to Dr. Norcon for his suggestion of the elliptical incisions, and believe that in ordinary cases where the nipple has a shape and some projection they alone would answer. In more pronounced cases the puckering of the fascia must be added.

As to result, while it is not claimed that these nipples would be selected by the sculptor as models for a Venus or a Greek Slave, it is claimed for this operation that breasts formerly useless can be so improved as to admit of the child nursing.

In conclusion let me call attention to the fact that the field is limited, and that this operation should only be done after the failure of mechanical devices fairly tried.

EDITORIAL ARTICLES.

BACKWARD DISLOCATION OF THE FINGERS UPON THE METACARPUS.

In a recent paper¹ the writer has drawn attention to dislocation of the fingers backward upon the metacarpus, giving as a reason for his paper, the fact that such are frequently very difficult to reduce and their mechanism little known in this country. The paper is prefaced by a record of the cases which were under his treatment, four of the fingers and two of the thumb, which illustrate points in the pathology or treatment of such cases.

CASE I.—Boy, *æt.* 10 years, recently while playing leap frog fell forward upon his out-stretched hands and displaced the right forefinger backward. Attempts to reduce it failed, the ordinary methods tried again under chloroform failed. A tenotome was then introduced in the back of the hand above the base of the phalanx to the outer side of the extensor tendon and the fibrous and tendinous structures to the outer side of the joint divided. The dislocation was reduced after flexion, circumduction and strong adduction. Recovery complete.

CASE II.—Boy, *æt.* 8 years. Fell on hand displacing left forefinger seven or eight weeks before. Several unsuccessful attempts had been made to reduce it. Chloroform was given, subcutaneous section of the glenoid ligament, then the internal ligament without improvement. Joint opened with antiseptic precautions and displaced glenoid ligament which adhered to head of metacarpal replaced. The finger was fully flexed a week later, and the result was satisfactory.

CASE III.—Man, *æt.* 30 years. Displaced little finger from fall of stone on back of hand. In this case earnest efforts had been made to reduce the dislocation but without success. Mr. Battle extended the finger fully, carried it backward, pressed the base against the metacarpal bone and then firmly flexed it. No anæsthetic was required. Complete recovery followed.

CASE IV.—F. *æt.* 13. Dislocation of forefinger of right hand, ob-

¹Backward Dislocation of the Fingers upon the Metacarpus. By William H Battle, F.R.C.S., Asst. Surgeon to the Royal Free Hospital and to the East London Hospital for Children.—*Lancet*, Dec. 23 and 29, 1888.

scured by swelling which had followed the injury, inflicted 24 hours before; the House Surgeon reduced this in a similar manner under directions without anæsthetic, and full use of the finger was obtained.

CASE V.—Dislocation of the thumb backward in a boy, æt. 12, years, caused by a fall on his hands. Attempts to reduce it with and without anæsthetics failed. The inner tendon of the flexor brevis pollicis was then divided, without success, the outer tendon was then divided, after which the thumb was replaced in position. Result good.

CASE VI.—Dislocation of the thumb backward in a girl æt. 6 years, of five weeks duration, caused by a fall on her hand. “Doctors had been unable to reduce it.” Manipulation under chloroform failed. Tenotomy was then performed of the outer head of the flexor brevis pollicis and any portion of the glenoid ligament which might be lying on the head of the metacarpal bone. Reduction was then effected by means of extension, rotation and adduction. Some difficulty was experienced in overcoming the tendency to ankylosis but she ultimately recovered complete use of the joint.

Pointing out the fact, that although much consideration has not been given in the past to dislocations of the fingers, the subject of dislocations of the thumb has been closely studied; these latter are enumerated in order to see whether there are any likely to cause a similar difficulty in reduction in the case of the metacarpo-phalangeal joints. 1. The action of the two heads of the flexor brevis pollicis in their altered relationship to the metacarpal bone which they embrace, as a button hole the button, the view generally adopted in this country. 2. Constriction of the neck of the bone between the lateral ligaments of the joint. 3. Folding in of the anterior ligament of the joint and the interposition of a sesamoid bone. 4. Contraction of the six muscles inserted into the phalanges of the thumb. 5. The presence of the long flexor tendon between the bones. 6. The cuneiform or clubbed head of the metacarpal bone. 7. The interposition of the sesamoid bones. 8. The constriction of the metacarpal bone by the boundaries of the button-hole slit. 9. The difficulty in applying sufficient force to the thumb. The names of those authorities, supporting these views are given, but it is pointed out that those in recent times who have given the subject most attention, lay great stress on the resistance of the anterior ligament to the reduction, and the opinion

that in the majority of cases this is the offending structure is confirmed. Lawrie, who wrote in 1837, gives a description of the parts after dislocation, which corresponds with this view; he did not, however, appreciate the importance of the condition in the treatment. The paucity of information on the subject of dislocation of the fingers is proved by reference to all the English text books of the day, to American authors, who usually dismiss it in a similar manner. Otis, however, brought the subject specially before the profession in America and in France Farabœuf, Polaillon and Jallaguier, have thoroughly investigated it, and in Germany, Schuller.

The anatomical arrangement of a joint is considered, that of the first finger being selected, as for example Fig. 1: attention is especially paid to the anterior, palmar, or glenoid ligament. This is very dense, strengthened in the middle line by the flexor tendon, united firmly to the lateral ligaments on each side, but much less strongly to the metacarpal bone, at which point it gives in consequence of sudden violent hyperextension of the joint, the displaced phalanx carrying the ligament with it over the head of the metacarpal bone.

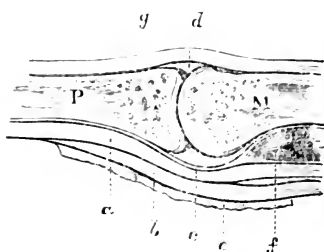


FIG. 1.—SECTION THROUGH METACARPO-PHALANGEAL JOINT (after Henle).

M, Head of metacarpal bone. P, Base of first phalanx. *a*, Tendon of flexor profundus digitorum. *b*, Tendon of flexor sublimis digitorum. *c*, Glenoid ligament. *d*, Dorsal ligament (absent, according to Gray). *e*, Vaginal ligament. *f*, Interosseous ligament. *g*, Tendon of extensor communis digitorum.

Dr. Otis in his experiments (undertaken because of failure to reduce two dislocations of the first finger) found that the anterior ligament always gave at the metacarpal attachment in the case of the fingers; in the thumb this varied somewhat, a difference being caused by the sesamoid bones. The observations of the author confirm this. At the same time it has been found that the lateral ligaments give to an

extent which varies from complete rupture to the yielding of some of the anterior fibres, so it is probable that the part which they play, if any, is a subordinate one. Farabœuf divided these backward displacements into three varieties. 1. Simple incomplete dislocation, the phalanx not having completely left the head of the metacarpal. 2. Simple complete, in which the phalanx has become displaced on the dorsum of the metacarpal bone and with its anterior edge on the head of the metacarpal. 3. Complex, in which the phalanx occupies a similar position, but the glenoid ligament with its sesamoid has become turned, and is interposed between the two bones, rendering the dislocation irreducible, (illustrated by Fig. 2), a state of the parts similar to that described by Lawrie.

The third variety nearly always results from ill-judged and violent attempts to reduce the simple complete form which always precedes it. Jalaguier was called upon to treat a complex dislocation of the index finger which resisted attempts by manipulation. After experiments on the dead subject, he came to the conclusion that the glenoid

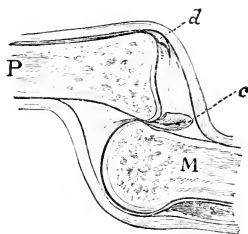


FIG. 2.—DIAGRAM TO ILLUSTRATE POSITION OF GLENOID LIGAMENT. ANTERO-POSTERIOR SECTION.

M, Metacarpal bone. P, Phalanx. c, Glenoid ligament displaced and turned. d, Ruptured dorsal ligament, occasionally present.

ligament was the retaining structure and successfully reduced the dislocation by dividing it subcutaneously on the dorsum of the metacarpal bone. Reference is made to cases where it has been found in this country, by Symonds, Croft, Davies-Colley. The diagnosis of these dislocations is usually easy. Agnew, however, states that he seen instances where the displacement has not been diagnosed. This part of the subject is dwelt upon briefly, the comparison of hands, deformity, uselessness of the fingers, shortening, projection of head of metacarpal in the palm, etc. Sometimes the phalanx is masked by the presence of inflammatory swelling on the dorsum of the hand due to the injury. Two conditions resembling forward displacement are mentioned; these are very rare. 1. Union of

epiphysis of metacarpal after forward displacement with the finger. 2. Union at the angle of the first phalanges in a case in which there had been fracture and displacement forward of the finger; just below the superior articular surface.

The treatment recommended and proved of value should be undertaken in the following way. 1. Manipulation, without anæsthetic, in a definite manner without violence by the dorsiflexion method. Tilt the displaced phalanx up until it stands upon its articular end, place both forefingers so as to hold it in that position and at the same time press against the distal extremity of the metacarpal bone. Under firm pressure with the thumb against the base of the dislocated phalanx, slide it into place, a proceeding generally accomplished with ease. In complex cases it is advisable to carry the base of the phalanx backward along the dorsal surface of the metacarpal bone, with traction on the digit, in order to try and get the ligament with its sesamoid bone more fully in front of the anterior margin of the articular surface of the phalanx before flexion. 2. Administration of anæsthetic and renewed attempts by manipulation, on failure of which, subcutaneous division of glenoid ligament on the dorsum of the metacarpal, in the middle line to avoid the sesamoid bones. It is pointed out that reduction has been effected by division of the lateral structures of the joint, but it is suggested that this has acted by freeing the lateral attachments of the glenoid ligament, and so placing it in a more lax condition. (See case 1). 3. In the thumb, lateral section also divides the tendon of the flexor brevis pollicis which is looked upon as a retaining structure by some; in these dislocations this method should next be tried. (See case 5). 4. Incision of joint under antiseptic precautions, reposition of ligament (See case 2), or flexor tendon. 5. Excision of head of metacarpal bone after severe compound fracture or ankylosis of joint especially in the case of the thumb, but an attempt to reduce the dislocation and preserve the joint by means of antiseptic applications, followed by passive movement usually to be undertaken. Great stress is laid upon the necessity of passive movement, undertaken at an early date, to prevent ankylosis.

We have not attempted to give the references or names of the authorities quoted. The paper is the result of a careful consideration of

these, and no statement is advanced without a reference to the authority supporting it.

WILLIAM H. BATTLE.

RECENT CONTRIBUTIONS TO PULMONARY SURGERY.

In some recent Russian papers the surgery of the lungs has been discussed. Dr. Zakharevitch, of Kharkov, has placed on record an account of a series of experiments with reference to the extirpation of this viscus¹, which are of much practical interest. In connection with this subject the case of pneumonotomy² under the care of Professor Opensovsky may also be considered.

In order to verify Glueck's and Hansschmid's statements as well as to elaborate a well-working plan for pneumonectomy in man, Dr. Zakharevitch has made 13 experiments on rabbits, 11 on dogs, and 9 on human cadavera. The following strictly aseptic and probably bloodless operation was performed in every one of the animals. Having made a subperiosteal resection of from 1 to 4 ribs, according to the size of the portion removed, he most cautiously dragged the latter out of the wound, tied its root with silk, cut away the part above the ligature, powdered the string with iodoform, returned it into the thoracic cavity, stitched the thoracic wound most hermetically, and applied a Listerian dressing. As a rule, the experiment was followed by a *post mortem* examination, the surviving animals being killed at varying intervals after the operation. The following points of considerable practical interest deserve to be placed before our readers.

A. Results of the operation: 1. Of 13 operations in 9 rabbits, only 2 proved fatal, death following immediately after opening the thoracic cavity. In one of the two, the whole lower lobe of the opposite lung was found to be infiltrated with tubercle. The other case refers to a rabbit in which the extirpation of the left upper lobe had been successfully performed a month before the second operation on the

¹An Experimental Contribution to Pulmonary Surgery. By Dr. V. M. ZAKHAREVITCH (Kharkov, Russia). *Transactions of the Kharkov Medical Society for 1887*, vol. ii.

²Pneumonotomy for Pulmonary Abscess and Gangrene. By Professor F. M. OPENSOVSKY (Dorpat, Russia). *Vratch*, No. 38, 1888.

right side. 2. Of 11 operations in 7 dogs, 3 were followed by death which in one case ensued from supervening suppurative pleurisy on the tenth day, while in the other two it took place instantly after opening the chest on a second operation, undertaken 2 months after a (completely successful) first extirpation. One of the dogs survived *four* years after two operations, always enjoying excellent health; it died from an entirely accidental cause.

B. Physiological Changes setting in after Pneumonectomy. 1. *Respiration* becomes invariably affected, and that the more so the larger the portion of the lung which has been removed. In some animals, breathing quickens and deepens, in some it becomes retarded and then deepens in a very striking degree. In either case, the alteration proves to be permanent or, at all events, remains for a very prolonged period after the operation, the phenomenon being especially pronounced after much exercise with fatigue. 2. Just after the operation, *pulse* quickens, and that sometimes very considerably (50 or 60 beats per 1'); simultaneously it becomes intermittent, the interruption being synchronic with the respiratory acme. 3. *Temperature* (rectal), as a rule, slightly rises just after the operation to return to the standard about the fifth day, and subsequently becomes permanently subnormal (from 0.3° to 0.7° C. lower comparatively with the animal's 1° before the operation). 4. *The body's weight* falls immediately after the operation to regain its normal condition in from 10 to 15 days in rabbits, and in from 20 to 30 in dogs. 5. As regards the *intra-thoracic pressure* the hermetical closure of the thoracic wound is a matter of the greatest importance. When the cavity remains open or when the sutures applied give way, an alarming dyspnoea sets in, the animal losing its ground rapidly and steadily. A hermetical closure of the wound under such circumstances relieves the condition as if by magic.

C. Anatomical Changes. 1. After the extirpation of the lung, the chest manifests an uncontrollable tendency to contraction. The ribs adjacent to those excised usually approximate themselves to a closer contact. 2. The pleura shows sometimes traces of a localized inflammation which may assume now and then even a suppurative character. 3. The ligatured portion of the pulmonary root, as a rule

does not undergo necrosis, but continues to live. Sometimes, however, it sloughs away and then, on the necropsy, may be found lying free in the pleural cavity. "The remaining portion of the lung operated upon proves to be always considerably enlarged." In some cases, its surface is found to be studded with numerous punctiform ecchymoses. 4. The liver and especially the heart are nearly always found to be similarly enlarged. 5. In some cases the mediastinal as well as the retro-peritoneal lymphatic glands also may undergo an enlargement which is dependent either upon a simple hyperplasy of the glandular tissue, or upon caseous degeneration.

D. Experiments on Human Cadavera were undertaken by the author in order to elucidate the questions, *a.* which ribs should be excised in man for removing this or that lobe of the lung, and *b.* where a counter aperture should be established for best serving drainage. The answers are these. 1. Since the root of the upper and middle lobes corresponds to the 3d intercostal space, and that of the lower one to the fourth, it is necessary to excise, in case of extirpation of the upper two lobes, the 2d rib; and in that of the lower lobe the 3d one. 2. The best drainage can be secured by establishing a counter opening in the eighth interstice, along the scapular or posterior axillary line.

E. General Corollaries. 1. Dogs and rabbits endure pneumonectomy relatively very well, "the animals often presenting a strikingly cheerful appearance even on the next day after the operation." 2. "A minimal respiratory area compatible with life and health amounts to two pulmonary lobes." In other words, an animal possessing two healthy lobes on one side of its chest, may be subjected to a total pneumonectomy on the opposite one, with good chances not only for the animal's recovery from the operation, but also for a long after-life." But "if only one lobe is in a healthy condition on either side of the chest, neither of the lungs can be operated upon," since opening the thoracic cavity on one side is followed by primary collapse of the corresponding lung. 3. Taking all in all, "both experiments on animals, and already published cases of surgical treatment of pulmonary cavities in man completely justify a more active operative interference in various regions of the pulmonary tissue." Hence, Dr. Zakhare-

vitch emphatically appeals to the profession to proceed with elaborating detailed indications for, as well as practising, pneumonectomy.

In Opensovsky's case of *pneumonotomy*, a well made and previously always healthy male peasant, æt. 30, was admitted 4 months after having caught pleuro-pneumonia. The patient had remained bed-ridden at the time only for a week. Two weeks later, when taking a steam bath, he had been suddenly seized with violent cough, during which he had expectorated a tumblerful of offensive pus. Ever since he had been suffering from agonizing cough with fetid sputa, fever and steadily increasing prostration and emaciation. On admission, a right-sided pulmonary abscess was diagnosed though repeated exploratory tapings gave invariably negative results. About three weeks after admission, all signs of a rapidly increasing gangrene around the abscess supervened, the patient's general state growing daily from bad to worse. As the only means of saving his life pneumonotomy was proposed and performed by Professors W. Koch and Opensovsky about the tenth day of the complication. The area of loudest tympanic tone and amphoric murmurs occupied the space between the fifth and seventh ribs vertically, and between the mammillary and posterior axillary lines horizontally, and measured transversely about 12 cm. Accordingly, Dr. Koch performed resection of the fifth and sixth ribs, removing from each a portion 10 cm. long. The pleuræ proving to be adherent, the operator plunged a thermo-cautery into the lung, striking a cavity at the depth of 2 or 3 cm. The patient (who had been anæsthetized but very slightly) began to cough, a pus jet jerking out on every succussion. On placing him on his right side, a tumblerful more of highly offensive green pus welled out from the (freely enlarged) wound. Having introduced his whole hand into the cavity, the writer at once found a necrotic focus on its inner aspect, and above the focus a large bronchus communicating with the abscess. The necrotized pulmonary tissue could be easily removed with fingers, without any loss of blood. The remaining surface of the cavity proved to be lined with a pyogenic membrane. The bronchial orifice was enlarged and the necrotic area as well as the external wound cauterized with the thermo-cautery, after which the cavity was washed out with a weak solution of

permanganate of potassium, a drainage tube inserted, and an antiseptic dressing applied. The irrigations, which caused some cough on each occasion, were repeated for 10 days twice daily, but later only once a day. On the seventh day the temperature became normal; on the thirty-eighth the drainage could be removed, the cavity having been almost completely obliterated. Shortly afterwards the wound was found soundly healed. On the eighty-first day, the man left, quite well, in which state he has remained ever since. On examination 1½ years after the operation the "region between the mamillary and posterior axillary lines was found to have the appearance of a shallow funnel with a scar at the deepest point," the respiratory excursions being diminished comparatively with the opposite side, the respiratory sounds rather weakened, but quite distinct everywhere. The vertebral column was somewhat scoliosed, the concavity looking toward the right. Analyzing his remarkable case, the author dwells mainly on the following points: 1. Pneumonotomy sometimes represents the only means for saving life in cases of pulmonary abscess. 2. The operation is borne quite well. 3. It should be undertaken as early as possible, that is, as soon as a pulmonary abscess has been diagnosed. 4. It is advisable to excise fairly long pieces of ribs and to make a free incision into the cavity, in order to secure both a thorough removal of its contents and a thorough disinfection of the parts. Moreover, free resection and incision promote a speedy and satisfactory obliteration of the cavity. 5. A thorough disinfection of pulmonary cavities seems to be endured without any untoward accidents. 6. Firm pleural adhesions constitute an important requisite for a successful issue of the operation, since they prevent suppurative pleurisy and make easier both the discovery of cavities and the removal of their contents. 7. Literature contains at present 18 cases of pneumotomy for pulmonary abscess, 9 of which recovered. In 6 of the 9 a complete recovery ensued (Teale, Rohden, Quincke, Runeberg, Blunt [*ANNALS OF SURGERY*, vol. viii, p. 311] Opensovsky), while in 3 a fistula remained (Quincke, Bacchius, Finne). The cases may be divided into three categories: *a*, those of pneumotomy in the strictest sense where no communication with the pleural cavity existed (Sutton, Teale, Rohden,

Quinke, Herrlich, Brookhouse, Rochelt, Blunt, Opensovsky); in all 16 with 6 recoveries; *b*, those where the communication was present (Radex, Payne, Bacchius, Finne, Runeberg); in all 5 with 3 recoveries; and *c*, those with a doubtful diagnosis (Sedgwick, Queiss, Waugh), in all 3 with 3 deaths.

VALERIUS IDELSON.

SKIN GRAFTING ACCORDING TO THIERSCH¹

Reverdin's important discovery of skin grafting in 1870 soon found its application in hospital practice, but lately it has fallen into disuse on account of two faults, one an after contraction of the skin covered granulation surface, the other is a separation of the healed skin.

Thiersch states that the healing of a granulating surface depends on two factors, viz. : first in the changing of the soft succulent blood-carrying granulation papillæ into the bloodless dry cicatricial papillæ, a result which brings about a diminution of the surface and the drawing together of the neighboring parts. Second, a covering over of the contracted papillæ with epidermic cells. Both of these factors, the contraction of the wound and the growth of the pellicle take place together within certain limits, and when these limits are reached the granulating surface remains stationary.

If skin be placed on granulations which have not attained their maximum of contraction the process keeps up under the transplanted skin, and there results the drawing together of the part with all the evils of cicatricial contraction.

If, on the contrary, the skin be applied to a granulating surface which has reached its maximum of shrinking, a further contraction will not take place, but the succulent granulations remain under the healed skin, and the slightest mechanical irritation is sufficient to stir up hæmorrhages or exudations, this causing the falling off of the skin which has been placed over them.

If these theories be true then both bad results of skin grafting are

¹By E. PLESSING, (Leipzig) *Archiv. f. Klinische Chirurgie*, bd., 37, hft. 1.

in a measure, due to the construction of the granulation tissue. Perpendicular sections show clearly two layers in granulating tissue, a lower layer, more or less dense, according to the age of the granulations and in which the capillary net work occupies a horizontal position, and from this dense layer the vascular branches run out perpendicularly, and form the upper or warty layer.

This upper layer plays the important part in the shrinking process as well as in the insecurity of the result. On account of this, Thiersch proposed to remove this upper stratum before transplanting the skin. Prof. Maas says that the important point for success is the way in which the freshening up has been done, it is not only necessary to freshen up at the edges of the ulcer, but above all, it is important to remove thoroughly the upper layer, and to expose completely the lower one with its horizontal capillaries, and between this layer and the transplanted flap a thorough adhesion will take place which can never be disturbed by cicatricial contraction.

The way in which skingrafting is carried out in the Leipsic Clinic is as follows:

Complete disinfection of the part from which the skin is to be taken, (any disinfectant may be used, but during the course of the operation a 6 per 1000 sterilised salt solution is employed) then in the granulating wounds, all the soft granulations are scraped away with a sharp spoon, the bleeding surface irrigated with the salt solution, sponged, covered with protective and compressed for 5 or 10 minutes till hæmorrhage has ceased. It is important that the right stage of granulation development should be reached before operating. The results are best when the granulations are about six weeks old, and their growth has been limited by repeated cauterisation and compression. When the wound is thoroughly prepared the skin grafting begins. The skin of arm and thigh is most often employed.

The skin free from fat, must be well stretched by the left hand, the right hand carries a razor with a long, wide and concave blade. The razor is held flat and is slowly drawn with a sawing motion through the upper layers of the skin. During this process the knife must be kept moist with the salt solution. The transferring of the grafts from

the knife to the prepared surface takes place immediately, the blade is laid on the wound and the edge of the graft is drawn over on to the wound by means of a probe, and as the blade is withdrawn it slips into place. The position of the graft may be corrected at will either with a probe or a small brush. The flap may also be shortened if necessary. The complete area is to be covered with strips of skin, and these strips should over lie the edges of the wound and come together as close as possible even overlapping each other slightly. The skin is gently pressed in place with a spatula. The dressing to be applied should protect and maintain the skin in its new position. The results are better when a moist dressing which is changed daily is used. The neighborhood of the wound is smeared with oil to prevent the dressing from sticking.

The grafts are covered with a strip of protective, soaked in salt solution, over this comes a pad of cotton, also moistened with salt water, this pad is covered by a large piece of protective, then comes another pad of dry cotton, and all is held in place by a cotton bandage, over which a dextrine bandage is applied to prevent slipping. If a dry dressing is to be employed, an iodoform one is the best. The places from which the skin has been removed are covered with iodoform dust, a dry dressing applied and left for one or two weeks.

The changes which are to be observed in the grafts within the first few days, are as follows; If they are of a pinkish color, success is pretty certain, if white, they will drop off in a few days; blood under a graft gives it a bluish color, endangers the healing process, but does not always lead to suppuration. It is possible for various forms of bacteria to find entrance into the wound and prevent healing; to do away with this danger, the dressing should be changed every day during the first week, and the surface irrigated with sterilized salt water.

If the wounded surface is not covered with grafts there appears on their free border a fibrinous exudation, and separation of the grafts begins, the healed ones detach themselves, or small epidermal blisters filled with pus appear on the healed spots and form small ulcers which gradually increase in size.

It also happens that the super-imposed skin is broken through from below by granulations, and in this manner disappears, at least, temporarily, but later when the granulations recede the epidermal islets are again seen. This the author does not believe to be due to an infectious process, but thinks it is because the grafting has been done too soon.

Syphilis may prevent the grafts from healing. The author analyzes a series of 40 cases, in which transplantation was carried out 78 times, 17 times on fresh wound surfaces, 61 times on scraped granulating surfaces. In 58 times the healing succeeded perfectly, 12 times it was incomplete, and eight times it was a total failure and the proceeding had to be repeated.

In summing up he lays stress on the following points; Careful disinfection of the hands and instruments, newly prepared sterilized salt solution (6 per 1000), proper choosing of time of operation, thorough hæmostasis, most complete covering possible of the wound with strips, immobilisation of the part, careful bandaging, daily changes of dressing, accompanied by thorough irrigation.

The results are better on scraped granulation surfaces than on loose or connective tissue (fascia, periosteum), glandular and muscular tissue give pretty good results. Spongy-bone tissue and exposed tendons yield no permanent result. Adhesion of grafts has never been obtained on compact bone.

F. C. HUSOX.

INDEX OF SURGICAL PROGRESS.

HEAD AND NECK.

I. Perforation of the Eyeball by the Knot of a Whip.

By H. P. DUNN, F. R. C. S., (London.) P. C., an attendant at the Paris Hippodrome, received a severe blow on the left eye causing an inverted jagged wound of the globe, on the inner side at the corneo-scleral junction. This was found to be due to the penetration and lodgment of the knot end of a whip. Panophthalmitis set in almost immediately but the patient would not consent to enucleation until the second day. Enucleation was then performed, the after-treatment was strictly antiseptic and the case ran a perfectly normal course. No meningitis occurred. On dissection of the extirpated eye, the knot end of the whip was found embedded in the vitreous.—*Illustrated Medical News*, Nov., 1888.

J. ANDERSON SMITH (London.)

II. Fifty Excisions of Goitre. By DR. D. G. ZESAS (Berne.)

These statistics are compiled from the material offered by the clinic of Dr. Niehaus of Bern. Of the fifty cases there were 27 females. Most of the cases occurred in females ranging from 10 to 40 years of age. There was only one fatal cases as a result of operation. There were no severe complications or injuries of nerves recorded. The typical symptoms of myxoedema, cachexia, etc., appeared in 3 cases, 32, 19, 55 years of age respectively, all female. There is nothing brought to light by these cases not already discussed in the literature. In some cases the isolated symptoms of cachexia appeared but after 3 or 4 months the patients for some unknown causes began to improve—have had no return of threatening phenomena. The method used in all cases was that of Socin. This was followed not only in cystic but also

in colloid and calcareous strumas. The success of the method depends on leaving enough healthy glandular tissue behind to continue the functions of the thyroid.—*Archiv. f. Klin. Chir.*, bd. 36, heft 3.

III. A Method of Partial Removal of Goitre Without Tamponade or Great Loss of Blood. By DR. EUGEN HAHN (Berlin.) This method, which has been carried out by Dr. Hahn on several patients affected with struma, consisted first of a median incision from the incisura jugularis to the cricoid cartilage. To this was added the lateral incision of Kocher for the division of the sterno-hyoid and sterno-thyroid with ligation of the superficial veins. The whole gland was thus exposed. The left upper lobe was then released and lifted forward, the left sup. thyroid art. tied with catgut. The thyroidea inferior was clamped and the arteria ima was tied by first exposing it in lifting forward the gland then passing catgut ligature about it. The superior thyroid on right side was ligated, the inferior thyroid of the right side was secured with clamp. After securing the above vessels the capsule was divided in its whole extent avoiding visible veins and the glandular tissue drawn forward with a hook. It was possible in this way to remove sections of the glands with scissors to such an extent as to leave but small portions of the gland behind. This was done without great hæmorrhage. The inferior thyroid arteries were only secured with a clamp, having a weak spring. This was done to avoid securing the accompanying nerve in a ligature. If disturbances of speech were observed after operation the clamps could be immediately removed. A weak clamp while controlling the circulation will not crush the nerve. The wound was then tamponed with iodoform gauze. After 24 hours the clamps were removed and secondary sutures applied. The advantages of this consist in the slight hæmorrhage, the facility with which portions of the gland can be cut away and this without laceration or ligation *en masse*, the diminution of danger of sepsis and that of tetanus. The remaining portions of the gland protect the patient against cachexia strumipriva.—*Archiv. f. Klin. Chir.*, bd. 36, heft 3.

HENRY KOPLIK (New York.)

IV. Total Extirpation of Goitre. By PROF. VASILY RAZUMOVSKY (Kazan, Russia.) A somewhat anæmic and meagre woman, æt. 35, was admitted with a parenchymatous goitre of 10 years' standing, and with complaints of the tumor occasionally causing severe paroxysms of dyspnœa at night, and generally interfering with her breathing on any household work. The goitre was fairly movable and uniformly elastic and had the size of a man's fist and an irregularly roundish shape. It reached from the hyoid bone down to the sternum and involved the whole thyroid gland; the isthmus and the right lobe, however, were much more enlarged than the left one. A total extirpation of the goitre was performed after Kocher's method under chloroform and antiseptic precautions, the operation lasting 2 hours. About 30 ligatures were tied, hæmorrhage being but trifling. The aftercourse was most satisfactory, the highest temperature being 38° C. On the 8th day the woman got up to walk in the hospital garden. The wound soundly healed about the 30th day. For the first 24 hours after the thyroidectomy there was observed a singular intermittency of the patient's pulse; a strong beat was rapidly followed by a series of accelerated and faint pulsations and then by a long interval, after which a single strong beat could be felt again and soon. On the next day, the curious phenomenon disappeared spontaneously, but the pulse remained quickened (110 to 120 per 1') for 8 days. The tumor removed contained numberless small cavities with colloid matter. When seen 1½ month after the operation the woman was free from all former symptoms as well as from all signs of cachexia strumipriva.—*Dnevnik Kazanskaho Obshtchestva Vratchei*, Dec. 27, 1887.

VALERIUS IDELSON (Berne.)

V. The Operative Treatment of Congenital Lymphangioma of the Neck. By DR. STORCH. (Hamburg). The surgical therapy of congenital lymphangiomata of the neck has undergone many changes and is not as yet definitely settled.

In the beginning of this century, Wutzer and his cotemporaries condemned any operative interference. About 30 years later Hawkins proposed puncture in cases of cysts of the neck, but the fear of sup-

puration and its complications restricted this treatment to those cases where the child's life was in danger from interference with the respiration. In 1839, Hawkins cured one case by extirpation of the cyst. Weinher, in 1843, condemned this procedure, as one which no careful surgeon had a right to undertake. Silk setons were then tried, but they set up such violent reaction that they had to be abandoned. In 1855, Gurlt spoke in favor of extirpation, notwithstanding his poor successes. Trendelenburg used puncture, followed by an injection of iodine, and his excellent results placed this method among the radical operations. With the advent of antiseptic surgery extirpation was again put in the foreground; still in 1882, König and Riedel judged this method as dangerous and applicable to only a few cases. Wöfler advocates incision and drainage of the tumor and stuffing the sac with iodoform gauze.

The author then reports a case of a 21 days old child which was brought to him in Feb, 1886, at the Jewish Hospital in Hamburg, suffering from a large tumor of the neck, which did not cause much interference with the nursing of the child. The tumor was about the size of a man's fist, soft, elastic, having a smooth surface, yielding on aspiration a clear, yellow, serous fluid which coagulated on standing.

On Feb. 24, 1886, the author enucleated the tumor, and found it to be adherent to the sheaths of the large vessels which had to be laid bare in order to complete the operation. The tumor was found to have a long pedicle which ran along the sheaths of the vessels into the thorax.

The wound was closed by sutures, drained, and dressed with iodoform gauze.

The patient made a successful recovery.

The macroscopical examination of the tumor showed it to consist of various sized cavities lying close together, and filled with a serous fluid. All the cavities seemed to intercommunicate by various sized apertures. The cyst wall itself was smooth and closely resembled the pericardium. Microscopical examination showed the cyst wall to consist of connective tissue, interlaced with fibrous and elastic tissue, and containing in some places many, and in other places few smooth muscular fibres.

Examination of a fresh specimen with silver gave clear endothelial markings.

The fluid contained lymph corpuscles and endothelial shreds.

The case is interesting in so far as it has seldom been tried to extirpate tumors at such an early period of life, (21 days). The author winds up his remarks by stating that an attempt at enucleating these tumors should be made, and if it was found impracticable the Wölflers proceeding should be tried.—*Deutsche Med. Wochenschrift*. No. 42.

F. C. HUSON (New York).

VI Forcible Dilatation in Malignant Stricture of the Gullet. By DR. V. I. DUBROVA. (Voronej, Russia). An extremely emaciated and cachectic woman, æt. 52 years, sought Dr. Dübrova's advice on account of absolute inability to swallow—even fluids—of a week's duration, the first symptom having appeared about a twelvemonth previously. An impassible malignant stricture of the gullet, situated just above the cardia, was diagnosticated and a gradual dilatation by œsophageal sounds at once resorted to. An olive, no. 1, could be forced through with but a moderate amount of violence, and from the next day the patient could be fed *per os*. The sounding was repeated every two days, the woman's health steadily and markedly improving for two and a half months. By the end of that period pulmonary symptoms (agonising cough, infiltration of the right lung under the scapula) supervened, and the patient commenced to rapidly lose ground. Exactly three months after the beginning of the treatment, she suddenly expectorated a basinful of blood and died a couple of hours later. No autopsy was allowed. Dr. Dübrova draws attention to the facts that (1) his patient survived three months after the commencement of the treatment, and about fifteen months after that of the disease; (2) that the average duration of the disease treated by dilatation is eight months (after Morell Mackenzie; but only five and a half months after M. E. Krusenstern; *vide* the *London Medical Record*, March, 1887); (3) that an average duration of the disease treated by gastrostomy is seven months, the patient surviving the operation on an average for twenty days (Morell Mackenzie); (4) that, therefore, dila-

tation gives better results in malignant stricture of œsophagus than gastrostomy does ; and (5) that, consequently, dilatation can be safely recommended and practised as a fully justifiable method of treatment of the disease. [In the *London Medical Record*, 1886, July, p. 277, and Dec., p. 529, 46 Russian cases of gastrostomy for cancer of the œsophagus may be found.]—*Proceedings of the Voronej Medical Society*, 1888.

VALERIUS IDELSON (Berne).

VI. Case of Dyspnœa from Mediastinal Abscess—Tracheotomy—Rupture of Abscess into Trachea—Recovery. By EDWARD A. WRIGHT, M. B., (Huddersfield). Patient, æt 12 years, suffering from dyspnœa, brassy cough and great restlessness. Was playing a few days previously without a coat in a cold wind. Had several well-marked rigors and symptoms as above. Nothing abnormal detected as far as larynx. Lungs healthy, temperature 101°. Symptoms became more urgent with paroxysms of dyspnœa, no membrane expectorated. No history of any foreign body being swallowed. Tracheotomy was performed as low as possible, but it was found that the obstruction was below. In the evening after the operation in a paroxysm of dyspnœa the boy tore the tube out. He became nearly pulseless and was evidently dying. An india-rubber catheter was pushed down trachea as far as the bifurcation, when a gush of pus followed, about an egg-cupful, very offensive. Breathing became gradually easier, fomentations were placed over wound, which was allowed to heal. Patient made an uninterrupted recovery. Dr. Wright suggests that the symptoms were due to a suppurating bronchial gland pressing on trachea. It is extremely rare for enlarged glands to cause pressure, especially after early childhood, but cases have occurred in which glands have ulcerated into the trachea. At least, two cases are on record in which the glands became impacted in the larynx and caused death. One of these was brought before the notice of the Pathological Society by Dr. Percy Kidd. The patient was an inmate of the Brompton Hospital for Consumption—a boy about 8 years old. He had a sudden fit of coughing in the night, followed by a few minutes of in-

tense dyspnoea, and died before aid could reach him. A bronchial gland was found to have ulcerated into the trachea at the bifurcation and to have become impacted in the larynx. Should a similar case occur again it would no doubt be the right treatment to do as Dr. Wright did and endeavor to burst the abscess by catheter, or stout metal probe. Dr. Wright suggests that a mirror might be introduced into the trachea wound; but at Brompton this has been tried in adults and found to be extremely difficult, the wound having to be very extensive to admit even a rhinoscopic mirror. Painting the wound and trachea with cocaine stops the coughing caused by the introduction of the mirror which takes place even under complete anæsthesia.—*Lancet*, September 29, 1888.

H. H. TAYLOR (London.)

BONES, JOINTS, ORTHOPÆDIC.

I. Spiral Fractures. By DR. KROELL (Strassburg). Spiral fractures are indirect fractures caused by a rotary force. The right spiral fracture is caused by a rotary force acting from the left to right, and *vice versa*. Another cause may be a direct longitudinal force with the consequent wedging of a process of bone into a neighboring bone (tibia and femur). Predisposing causes of fractures of other varieties hold also in cases of spiral fractures. In the long bones we have as agents in causing fractures a twisting of the limb in a machine or between two wheels. Gunshot wounds are also a cause of spiral fractures. Bornhaupt insists that in these cases the ball at the moment of contact causes rotation of the long bone on its long axis. Among the symptoms may be mentioned an audible crushing noise; palpation reveals in some cases the line of fracture (Bruns); intense pain exists not only at the point of fracture but above and below the point of fracture. In course of the line of fracture we have extravasation of blood. The spiral fracture has its seat generally at the most delicate and least resistant part of the bone. In simple spiral fracture if reposition fail the soft parts may suffer much injury. There is in weakly individuals a great danger of inflammation in the bone marrow, tuberculosis, caries, etc. The nature of the spiral fracture causes a separa-

tion of some extent of the periosteum and subsequent danger of necrosis. Both these influences will act against the union of the fragments. The formation of large splinters may cause difficulties in union of fragments. The severer forms of inflammation of the periosteum, bone and medulla are more frequently found in these fractures than in fractures of the ordinary varieties. Moreover, fat emboli, tetanus, septicæmia, delirium and fatal issue are more common in spiral complicated fractures. The recovery in these fractures is of much longer duration. The diagnosis is not difficult in those cases where an external wound exists. In subcutaneous spiral fractures palpation is a means of diagnosis. Excessive mobility of fragments shortening, protrusion of the broken fragments and the history are points of diagnosis. Absence of direct violence and the presence of pain on manipulating fragments at a distance are of importance. The prognosis is graver than in longitudinal and transverse fractures. The author concludes that modern antisepsis will allow our treatment of these fractures to be more conservative than formerly. In spiral fractures bone suture and extension may be found useful adjuncts in treatment.—*Zeitsch. f. Chir.*, bd. 28, heft. 2.

HENRY KORTIS (New York).

II. Case of Dislocation of Seven Vertebræ en masse. By Dr. K. SCHULTZ (Margelan, Russian Asia).—A gunner was knocked down by frightened horses drawing a 70 *puds* (about 2,520 pounds) piece, the two right wheels of the carriage swiftly passing across his loins, while a left wheel slightly touched his left leg. When brought to a lazaretto shortly afterward, he was very pale and complained of severe lumbar pain and inability to move his lower limbs. The patient having been placed on his abdomen, an enormous fluctuating (bloody) tumor was found occupying the spine from the 8th dorsal vertebra down to the sacrum, the skin over it being intact. On examination with a finger, the last three dorsal and the first four lumbar vertebræ proved to be dislocated forward as a whole, the apex of the 10th dorsal spinous processes being felt at the level of the base of the 8th one. The ribs were intact, but the 8th ones formed each an abnormally

strong curvature. There was no crepitation. Sensibility and motion were totally absent on both sides up to the upper limit of the dislocation. The bladder was paralyzed, catheterization removing bloody urine. On the third day Dr. Schulz decided to make an attempt at reducing the formidable luxation. No chloroform was administered, the patient lying as always on his abdomen. Having ordered four assistants to steady the man's shoulders and thighs, the author, standing astride over the patient, placed his palms on the abdomen and commenced to produce a firm and steady pressure on the abdominal wall. In a few moments he distinctly felt, under his hands, "some crackling and then a vague knocking sound which did not resemble at all the sound usually heard on reductions of bones of extremities." At the same time he noticed that the anterior (abdominal) prominent vertebral mass gradually yielded to his pressure, while the posterior (lumbar) depression disappeared. A closer examination showed that all the spinous processes but one fully regained their normal size, only the 4th lumbar vertebra remaining somewhat depressed, though but very slightly, compared with the former state of things. To keep the reduced mass *in situ*, the man was left on his abdomen with a hard cushion below, placed opposite the parts. There was but little pain during the manipulation; generally, the man bore them well, except a subsequent slight faintness. On the next day he first complained of pain about his (slightly crushed) left leg, while there appeared some mobility in his right lower limb. On the second day after the reduction, sensibility, micturition and (after a sitting of abdominal massage) defecation became normal. Under the influence of spinal massage, a steady improvement followed. On the forty-second day after the accident he was able to get up and take a couple of short steps. On re-examination six months later, there was found nothing abnormal about his spine beyond a swelling (blood-cyst) of the size of a hand's palm, at the level of the 4th lumbar vertebra. The lumbar flexion, however, was markedly limited, the extension *nil*. All other movements were free, though rather cautious, his carriage being upright. The patient complained only of his being unable to sleep on the back, and of his being easily tired, the fatigue giving rise to lumbar pains

The man was discharged from military service as an "unfit." Nevertheless, Dr Schulz is satisfied with the results of the reduction, since without the latter the patient would either die or, at all events, remain helpless.

VALERIUS IDELSON (Berne).

III. Temporary Osteoplastic Resection from the Pre-pelvic Wall for Extra-Peritoneal Exposure of the Bladder and the Neighboring Structures. By DR. P. NIEHAUS (Bern.) The author describes a procedure for more readily and certainly gaining access to the bladder, its interior and especially neck, and adjacent parts (cf. Also Langenbuch's *sectio alta subpubica*, ANNALS OF SURGERY, July, 1888.) An incentive was found in the ready healing of fractures of the pelvic arch, etc.

Vertical incision from above the bladder in the linea alba, around the root of the penis, than along the cruro-perineal fold to the upper third or middle of the ascending ramus of ischium. Here in the inferior angle of the wound the periosteum of the ramus is cut vertically and carefully pushed back. Division of bone by chisel. Small incision on horizontal pubic ramus close to inner border of crural vein, section of pectineus muscle and periosteum of pre-superior surface of the bone, careful lifting of the periosteum and division of bone with chisel. Then divisions of symphysis with knife or chisel and separation of inner soft parts to the lower resection-point. With two fingers behind the respective portion of selected pelvis draw this down and out putting the urogenital diaphragm on the stretch so that it can readily be freed without injury to vessels or nerves (vena dorsalis penis, and branches of common pudic artery, vein and nerves.) The corp. cavern. with the musc. ischio-cavernosus divided close to the bone. If the vertical incision does not afford sufficient room a lateral one may be added parallel to and just above Pourpart's ligament. In the female the round ligament is simply severed. In the male the spermatic cord has to be avoided. The testicle is drawn out of the scrotum carefully and laid to the side, to be brought back into place after the operation.

In this way we expose the whole side of the bladder, neck of the pelvis, beginning of the urethra, prostate, etc. The bladder can readily be freed from the peritoneum, the lower portion and mouth of the ureter are readily found. In the female the posterior vaginal wall, bladder and its fundus are exposed; the uterus, especially its lower segment and the adjacent ureter are easily accessible. On opening the lateral bladder wall, the whole interior is freely accessible. Drainage from the deepest part of the bladder is thus achieved. According to the case the gate is closed immediately or after some days and the symphysis sutured with silver wire or a very firm circumpelvic bandage applied. The obturator nerve and vessels are somewhat stretched but the periosteum protects them from injury.

The operation is wholly extra-peritoneal. He claims that it exposes the bladder as no other method yet devised. His experience covers 10 cases on the cadaver and one in the living. The latter was a tubercular fistulous infiltration from cæcum to bladder and external surface; satisfactory result. Three cuts illustrate the article.—*Centbl. f. Chir.*, 1888, No. 29.

WILLIAM BROWNING (Brooklyn).

IV. Resection of the Hip Joint in Arthritis Deformans.

By DR. D. G. ZESAS (Bern.) A case of arthritis deformans in a male æt. 60, operated (resection) upon by Dr. Niehaus, of Bern, causes the author to inquire into the literature for similar cases. It was found that only one case, that of Fock, was recorded of resection of hip at so advanced an age. But in Fock's case the arthritis deformans had a traumatic origin some 26 years previous to operation. Niehaus' case was of the "idiopathic" (?) "spinal" character. While in the idiopathic form the affection is polyarticular, the traumatic form is mostly mon-articular. Author is diffident in drawing conclusions, but in the cases of Niehaus and Fock resection relieved the pains of the patients either entirely or to so marked an extent as to be too slight to cause inconvenience. A return of disease has not occurred up to date, some two years, in Niehaus' case. In cases of similar diseases at the elbow joint return of disease did not occur after five years (up to date.) In the literature Fock and other authors are silent upon this point. The

functional result of operation is bad in the recorded cases. The patients must use crutches for the rest of life. The prognosis as to life following upon operation is good. All cases recorded have recovered after operative interference.—*Zeitsch. f. Chir.*, bd. 27, heft 5 and 6.

V. Traumatic Luxation at Both Hip Joints. By DR. PAUL NIEHAUS (Bern.) The author reports a case of double luxation at the hip and has collected 26 cases with literature including his own of the same accident. Of these cases the head of the femur on both sides was thrown forward (obturatoria) in 4 cases and in 4 cases the head of the femur on both sides was thrown backward (iliaca). In the remaining case the head of the femur held different positions on either side. In twenty cases reduction was successful. In four there was no relief. One case (author's) died not as a consequence of the luxation but the means of relief (resection.) Causes of these luxations were various generally a trauma pushing the trunk violently forward or backward. In one case a force falling on the sacral region while the body was bent forward and the thighs balancing in an extremely abducted position on the feet. Again external violence imparting a severe twist to the pelvis will produce the above accident.—*Zeitsch. f. Chir.*, bd. 27, heft 5 and 6.

HENRY KOPLIK (New York).

VI. Cure of Acute Osteo-Myelitis of Neck of Femur; Recovery with Unimpaired Joint. By N. C. MACNAMARA (London.) A strumous looking lad, æt. 9, about 14 days before admission received a severe blow over the region of the great trochanter of his left femur. At the time of the accident there was no external bruise, but he suffered great pain at the seat of injury, especially when he attempted to move the limb. On admission the temperature was 103°; the left thigh was slightly flexed and abducted; any attempt to move the limb caused violent pain in the joint. The thigh was not swollen, but the depression along Poupart's ligament was obliterated from effusion into the joint and surrounding tissues. Ice bags were applied over the joint without any relief, and a splint fixed to the limb. Two days after admission, the symptoms having increased in severity,

an incision was made from behind the great trochanter into the joint, so as to afford drainage as the boy lay on his back in the bed. On examination of the joint with the finger, the neck of the femur felt rough and bare, and the tip of the finger could be inserted between the neck of the bone and the epiphyseal cartilage when the patient's leg was abducted. While this was being done a small quantity of pus escaped from the wound. This pus was found to be swarming with staphylococci. The operation was done under strict antiseptic precautions, and a drainage tube was retained in the joint. The boy passed a good night, the pain having almost completely disappeared. The dressings were removed on the fifth day after the operation, and the drainage tube on the 12th. In the course of six weeks he was discharged, being able to walk without the slightest inconvenience, and the movements of the hip joint being perfect. In some remarks which the author appends, attention is drawn to the good results which can be obtained from early interference in cases of acute inflammation in growing bones.—*British Medical Journal*, July 14, 1888.

H. FERGUSON (London).

VII. The Results of Orthopædic Surgery in Pes Varus.

By DR. G. KRAUSS, JUN. (Darmstadt).—This is a very exhaustive critique and review of the various methods, non-operative and operative, of the treatment of club foot. The author draws on the material of Krauss, senior, for the support and illustrations of conclusions tending to favor almost exclusively the methods of treating club foot with apparatus. The author concludes that the weight of opinion tends to hold in an unfavorable light the operation of cuneiform resection of the tarsus. One case is cited where the wedge-shaped resection having been performed without result, relief was sought in the orthopædic methods (splints, shoes, etc.).

The talus extirpation also is unsatisfactory. There remains the treatment advocated in Germany by Krauss by means of orthopædic apparatus. The operation of Phelps, the author thinks, is still too young to command any positive opinion as to its true position. There is nothing new brought forward in the paper.—*Deutsch Zeitsch. f. Chir.*, bd. 27, heft 3 and 4.

VIII. The Therapy of Club-Foot in the Clinic at Heidelberg During the Last Decade. By DR. GUSTAV KRAUSS (Darmstadt).—Professor Czerny teaches that in *pes varus* the orthopædic methods surpass in their results the operative treatment (resection). In the former the elastic walk remains to the patient, whereas resection gives a stiff gait. The talus extirpation corrects only the apparent deformity, while the apparatus is more far reaching and helps to correct the false position of the different parts of the skeleton involved by the club-foot deformity. According to Professor Czerny, the orthopædic treatment of club-foot up to the fourth year of life yields better results than the operative methods. In the adult the choice between orthopædic and operative measures is more in favor of the latter. If a return of symptoms occurs in those treated by the orthopædic measures, the patients may be treated again in the same manner as at first. Return of symptoms in operative cases demand generally an operative procedure followed by orthopædic treatment. Cases must be individualized, but in general the rule is to try all orthopædic means before resorting to operation. The social position of the patient may prevent the undertaking of a long course of treatment. Here we will naturally be operative in idea. In the clinic of Heidelberg the congenital club-foot is put under treatment two or three weeks after birth (Brückner's method). Massage, redressment, tapotage are used in slight cases of *pes varus*. The children are manipulated twice a day under observation until redressment is effected; they are then seen once a month. Massage in a marked degree increases muscular tonicity of these little patients. Tenotomies of the tendo Achilles, fascia plantaris and tibialis posticus occur most frequently. The plaster splint is best applied with necessary redressment in small children with chloroform narcosis. Splint remains 14 days, followed in slight cases by massage and apparatus. After tenotomy and redressement Scarpa's shoe is worn during the day, and Czerny's splint at night. The external splint at first should have an angle of 90° to the foot piece. Prof. Czerny holds that cure shall be evidenced by the patient's ability to stand himself on his toes and to crouch down while the plantar surfaces are well set on the ground without falling. In or-

der to develop the muscles of the calf of the legs, Prof. Czerny directs patients to continually exercise the position of standing on the toes and to take a crouching position while the plantar surfaces of the feet are in contact with the ground. Author follows with tables of patients treated in the clinic for club-foot. The percentage of club-foot to all other surgical diseases was, during the past ten years, 0.46 %. The occurrence of congenital forms of club-foot to other forms is 78% to 81 %; paralytic, 18.4 %; traumatic club-foot occurs 1.4% of all cases of club-foot. In congenital double club-foot the right side was more markedly deformed in 13 cases of 23. Author cites only 3 cases of the Heidelberg clinic (137 cases) where heredity of club foot was traced through some member of family. Among 137 cases of club-foot, the following anatomical anomalies were found: Torticollis (1), chronic hydrocephalus (1), manus valga (3), athetosis (1), simplicitis (3), double six fingers (1), umbilical hernia (1), absence of a toe, etc. (1), progressive atrophic paralysis (3).

In 3 congenital cases subsequent scoliosis developed. Though the congenital cases are put under treatment as soon as possible, most cases are not seen until after the third month, 54 + %. Among 126 cases of club-foot 13 were treated after operative methods; in these cases the results would have been more satisfactory had an orthopædic treatment been adopted.—*Deutsch Zeitsch. f. Chir.*, bd. 28 heft, 4 and 5.

HENRY KOPLIK, (New York).

IX. A Case of Rachitis Adolescentium. By C. B. KEETLEY, F.R.S.C. (London). Emily R. æt. 20 years, about eight years (!) ago noticed marked swelling of the right hip, diagnosis varying between dislocation, periostitis and tumor. Nothing was done for the case, and no improvement taking place she was brought under Mr. Keetley's care who after careful observation, diagnosed rachitis adolescentium (from the slow progress of the affection and the sudden development of a superadded scoliosis) attacking first the upper epiphysical region of the right femur, and after some years the epiphysical regions of the vertebræ. The scoliosis was not due to the apparent

shortening of the right leg, for that had existed some years without affecting the spine.

Owing to the practical difference in length of the two legs, due to the curve of the right femur, and only partially remedied by wearing a high boot, Mr. Keetley determined to use more radical measures. He accordingly removed a wedge of bone from the convexity of the prominent right femur just below the trochantors, snapped the femur in two, divided the adductor longus and straightened the limb. The after progress of the case was uneventful and the final result very satisfactory, the right heel coming down to the level of the left. A Sayre's jacket was ordered for the scoliosis. Microscopic examination of the wedge of bone removed showed the changes characteristic of rickets.—*Il. Med. News*, Sept., 1888.

J. ANDERSON SMITH (London).

BLADDER.

I. The Suprapubic Incision of the Bladder. By DR. K. EIGENBRODT (Bonn). This article gives a resume of the methods followed in Trendelenburg's clinic in the suprapubic operation for stone and disease of the bladder. It includes an analysis also of 38 cases operated upon according to this method. Trendelenburg lays small stress upon the inflation of the rectum in order to raise the prævesical fold of peritoneum. Though by this procedure the operation is facilitated, still it is not a necessity to an experienced operator. The distension of the bladder is not carried to extremes, but it is sufficient to have a distinct dulness above the symphysis. Cases of rupture of the bladder due to forced distension are on the increase in the literature. In some cases we must be content to operate without filling the bladder. The preparatory course of treatment (Petersen, Perier) of repeated injections in contracted bladders may also be omitted. The presence of a cystitis does not demand this preparatory treatment. No benefits accrue from these proceedings. The open treatment of the wound in the bladder is the best means of obtaining asepsis.

Trendelenburg at first retained the usual median incision of the abdomen; in recent operations the advantages of the transverse incision

above the symphysis both for the operation and after treatment has become more apparent. The transverse incision was suggested by two cases (both operated for stone) in which there existed enormous panniculus adiposus and pendulous abdomen. In both cases the transverse incision was a success; the prævesical peritoneum could be avoided with ease and greater certainty than by the median longitudinal incision. It is preferable in obtaining a free view of the interior of the bladder (stone, tumor). Such a transverse incision allows drainage at both extremities. The gaping incision in the integument can be diminished in size by lateral sutures. A T-shaped drainage tube is inserted through the wound into the interior of the bladder. Trendelenburg performs the transverse incision over the symphysis as follows: After dividing the skin and subcutaneous fat, the muscle tissue being exposed, it is important to divide muscle and fasciæ as closely as possible to their insertion. The index finger of the left hand is pressed against the recti and the knife is carried closely to the superior and posterior surface of the symphysis. The tendons and fasciæ part easily and expose the prævesical fat. The structures are now freed from the bladder by blunt means, and, the prævesical fold of peritoneum being easily avoided, is lifted backward and upward with the fingers. This incision into skin and fasciæ must vary, according to the purpose of the operations, from 3 to 8 cm. If the pelvis be placed high, the bladder comes more easily and fully into view. The intestines fall more completely away from the field of operation. After the operation the bladder is thoroughly washed with sublimate solution (1-3000 or 5000). The T-drain is fixed in the wound, the crevices being filled with iodoform gauze.

Trendelenburg now uses the position on the side with flexed lower extremities to keep the wound drained. In old people and children, if possible, a frequent change of position from side to side is desirable. The use of cushions to avoid decubitus is mentioned. Trendelenburg has never completely closed the vesical wound by suture. Recovery in simple cases (stone) has required three and four weeks. The bladder drain was removed after the first, at latest the second week. In no case of the 38 of *sectio alta* did infiltration of urine or phlegmon

occur. Closure of the abdominal wound and recovery was prolonged in cases of tumor or hypertrophied prostate in patients of advanced age.

Of the 38 cases, 7 died in course of treatment, 18.4%. But in no case could the death be directly ascribed to the high incision of the bladder. In four cases the operation could be charged *indirectly* with causing death. In two cases (carcinoma of the bladder) the operation was performed for symptoms (bleeding and pain) threatening the life of the patient. A third case (stone) died with collapse and delirium tremens. A fourth case, æt. 72 years, pelvic abscess forming two months after operation in an exhausted subject hastened death. In the remaining three cases death ensued one month after operation with disease of the bladder or kidneys. It is noted that of 15 patients treated for disease of the bladder walls, an additional death to those above recorded occurred in a case of carcinoma one month after operation from pyelonephritis. Another patient, tuberculosis of the bladder, died after three months with general tuberculosis. Four cases performed for impermeable urethral structure in order to facilitate posterior catheterization recovered. Trendelenburg has during the past eight years operated upon all cases however unfavorable, therefore cannot be accused of selection. He has only resorted to the method of *sectio alta*. Contrary to the doctrine of König, Trendelenburg has performed the *sectio alta* in the so-called simple and severe alike. Of his 19 cases of stone and foreign body, 14 may be placed in the category of simple cases. The patients were young or middle age; in all complete recovery followed. Of these 14 cases it must be confessed that 10 could have been treated with the perineal incision. The high operation especially applies to encapsulated stones (case of Trendelenburg). It is in many patients impossible to distinguish the simple cases before operation, and it would seem to involve a certain amount of risk should we in some perform the perineal operation. Trendelenburg's method of applying the high operation in all cases would appear the correct procedure. In patients of advanced age operated upon for stone, and in whom prostatic hypertrophy exist, it is important to secure thorough evacuation to urine from the bladder after operation by continuance of catheterization.

All the cases of tumor of the bladder walls (8) operated upon by Trendelenburg were carcinomatous and advanced. The results here are not any better than those of other operators. In cases where the interior of the bladder must be illuminated, an apparatus with the Edison light is used. In the cases of disease of the bladder wall, the diagnosis *during life*, even when the bladder is opened, is not so simple; a very good illumination of the bladder is necessary to recognize the isolated tubercles, but at the first glance the ulcerations found in these cases will immediately point out the nature of the disease on account of the rarity of ulcerations in other affections of the bladder. The author at the close advocates *sectio alta* and posterior catheterism in cases of impermeable strictures of gonorrhœal or traumatic origin where external urethrotomy has failed in effecting an entrance into the bladder.—*Zeitsch. f. chir.*, bd. 28, heft 1 and 2

HENRY KOTLIK (New York).

II. A New Method of Drainage in Suprapubic Cystotomy. By E. H. FENWICK, F. R. C. S., (London). The method advocated by Mr. Fenwick depends on the principle of the Sprengel pump, and is described by its author as follows: "An irrigating can is placed on a chair at the bedside, and its tube, with a clip affixed to regulate the outflow, was dropped into the chamber under the bed. The drainage tube from the bladder is connected with it, at an acute angle. A continuous dribble of water from the reservoir falling into the chamber sucked the urine from the bladder as fast as it collected there, and the patient is kept perfectly dry."

It is not claimed for this method that it is essentially superior to the other known methods, but in feeble old patients who are particularly liable to eczema or bed sore from continual soakage of the overflowing urine it is thought that it may prove of as much service as it did in the author's cases. *Illustrated Med. News*, vol. 1, 1888.

J. ANDERSON SMITH. (London).

III. Two Cases of Suprapubic Lithotomy in Boys. By DR. S. L. SEGAL (Kharkov, Russia). I. A weak and sickly boy of 12, with severe symptoms, of six years' standing, and a faintly acid

urine. Median incision, 4 cm. long, beginning a finger's breadth from the symphysis. The stone removed was flat, oval, rough, hard, of a gray yellow color, dimensions $4 \times 2\frac{1}{2} \times 1$ cm. It contained a cinnamon brown nucleus of the size of a bean. The drainage tube fell out on the fourth day, from the 12th all urine passed through the urethra. Discharged well on the 20th. II. A well-nourished boy, æt. $4\frac{1}{2}$ years, with two years' disease, slight vesical catarrh, and a faintly alkaline urine. The incision measured 2 cm., the stone $2 \times 1\frac{1}{2}$ cm., it was oval, light-brown, centrally hard, with softish peripheral layers. The drainage fell out about 24 hours after the operation; on the 8th day all urine passed through the urethra. On the 21st, left well. In both the operation was conducted under chloroform and $\frac{1}{12}$ grains of hydrochlorate of morphia. Having washed out the skin with a 1 per cent. carbolic solution, the author introduced a colpeurynter into the rectum, filled it with water, then injected into the urethra a 3 per cent solution of hydrochlorate of cocaine, emptied the bladder, washed it, and distended with 160 or 200 grammes of a 2 per cent. boracic lotion. The catheter was removed immediately after opening the viscus. The stone having been extracted, the bladder was again washed out with the boracic solution, and a drainage tube inserted at the lower angle of the abdominal wound. The remaining part of the latter was closed with muscular and cutaneous sutures, after which the wound was dried, powdered with iodoform and covered with hygroscopic cotton wool and ice bag. For the first 4 or 5 days, the dressing was changed 6 or 8 times daily, while the bladder was washed out through a catheter twice daily up to a complete closure of the vesical wound. In both of the patients the temperature oscillated between 38° and 40°C . for the first five days.—*Meditsinskoie Obozrenie*, No. 6, 1888.

IV. Two Cases of Suprapubic Lithotomy in Boys. By DR. NIKOLAI N. RIISANOFF (Novokhopersk, Russia). (1) A boy, æt. 3 years. Having filled up the bladder with a warm boracic solution, Dr. Riisanoff hooked the wall and made an incision between two hooks. At this stage there suddenly appeared in the narcotised child violent retchings which expelled the fluid from the viscus, while the

latter simultaneously slipped out from the author's hands to sink into the abdomen. Being unable to make out the incision, he made another and introduced a finger into the organ, but this time to his utter consternation, failed to detect any stone therein; in fact, the bladder proved to be empty, though the presence of a stone had been established beyond doubt just before the first incision. Anyhow, it remained only to close the abdominal wound, with three stitches, the vesical incision, or rather incisions were left open. On the third day while changing the dressing, an oval, oxalate stone, weighing 1 gramme, was found sticking to the wound, under the longest suture, and was easily extracted. Dr. Rüsanoff thinks the calculus had been ejected during the retching to bury itself somewhere in the antevésical cellular tissue. No suppuration occurred, the child making an excellent recovery. (2) A peasant boy, æt. 3 years. The bladder was fixed by means of stout silk threads and then incised. An oval, oxalic calculus, weighing 3.68 grammes, was extracted. The boy speedily recovered.—*Pract.*, No. 8, 1888.

VALERIUS IDELSON (Berne).

V. Tubercular Cystitis; Hypogastric Incision; Drainage; Good Functional Result. By EDMOND BLANC (Paris). After remarking that the capital indication in these cases is to secure physiological rest to the bladder by means of free drainage, the author relates the following case:

Jean B. V., æt. 14 years, admitted to the Hotel Dieu, July, 1886. One sister died of phthisis, another sister now suffering from the same disease. Patient first noticed bladder symptoms in April, '86. They were chiefly as follows: Hæmaturia, frequent painful micturition, pain radiating to the end of the penis and much aggravated by walking or riding, occasional sudden stoppage of flow during micturition, and passage of gravel, general condition most miserable. The urine contained blood, mucus and pus; bacilli were not looked for. The diagnosis lay between calculus and tubercular cystitis. The sound revealed a hard body at the posterior half of the bladder, causing a slight grating.

A suprapubic incision was made and the bladder thoroughly ex-

plored with the finger. No trace of calculus discovered. A long caoutchouc tube, fenestrated only in its vesical part, was passed through the urethra and out through the vesical wound (*drainage de Demons*) and boracic gauze dressing applied. As long as the drainage tube remained in place not a drop of urine touched the wound, great relief in the symptoms followed this treatment, but the patient died in September from uræmia which was sufficiently explained by the state of his kidneys, the left being one large pyo-nephrotic sac, the right presenting three cretaceous masses as big as a walnut. On the posterior wall of the bladder there was a calcareous deposit with ample evidence of cystitis. There were some old tubercles at the apices of the lungs.

J. ANDERSON SMITH (London).

REVIEWS OF BOOKS.

THE DISEASES OF THE CHEST. By VINCENT HARRIS, M.D., F.R.C.P.
Student's Series. London, J. & A Churchill. 1888.

This little book is very carefully written and well got up. Of course the attempt to condense so extensive a subject in so small a volume has rendered it unavoidable that some points should have been somewhat lightly treated of. For instance, the causes of hæmoptysis are merely stated, and its treatment, which is of such anxious moment to the medical attendant, we think ought to have been more elaborate, the action and probable uses of the different drugs employed being discussed. We should have liked to have had Dr. Harris' own opinion as to the treatment which he considers it best to adopt. In the first part of the work he very rightly gives up some space to a careful account of the anatomy and physiology of his subject. We cannot quite agree with all he says in the treatment of empyema. "It is best to do the operation under antiseptic precautions." For the word *best* we should like to substitute *imperative*. No one with any experience of empyemata can doubt the difference in results between those cases which are treated and kept antiseptic from beginning to end. Instead of fixing the tube with silk lines, a broad flange will be found to be much more effective. He favors washing out the cavity with a solution of carbolic acid, which, except in some septic cases, we believe to be totally unnecessary. We should like to point out that carbolized tow is not antiseptic, and therefore, except in cases that are septic, Lister's dressings, wood-wool and Alembroth wool are the most suitable. A second opening is rarely necessary. With regard to operations in the treatment of bronchiectasis Dr. Harris is certainly too hopeful. How many cases has he seen on the post-mortem table which could in any way have been benefitted by incision and drainage? After some experience both in operations and post-mortem cases we are very doubtful if it can be of any use except in an extremely small number of cases. The disease is hardly ever limited to one cavity, the exact position of the cavity is very difficult to determine and other cavities may remain un-

detected by even the most experienced auscultators. We therefore cannot agree with him when he says that "yet in others the treatment may be said to have been highly beneficial." He quotes Dr. Theodore Williams who had six cases operated on with three deaths. Only one of these could be said to be successful. (Was it a localized empyema?) Not a very encouraging table surely! With regard to the infectiousness of phthisis he puts the question clearly and fairly, and we entirely agree with him that there is as yet no reliable evidence to show that the healthy can be infected from the sick. The following sentence considerably astonished us: "The fact that the majority of those who breathe the air, which has been proved to be *very full* of the bacilli in chest hospitals, etc." The italics are our own. Are there any really reliable observations to show that the bacillus does exist in the air? Even certain observers who have stated their presence admit that they are in extremely small numbers—certainly not that the air is "very full of them." It would be interesting to have Dr. Harris' authority for such a statement. We consider that it is the duty of a reviewer to challenge statements which he believes to be unsupported by any facts, as they are apt to be quoted to mislead. He concludes with diseases of the heart and aorta, and being limited to space has certainly picked out the most salient points for a beginner to notice. On the whole we believe that the work will be very useful to a beginner; and although we have questioned one or two statements, still for the most part it is accurately and fairly written.

H. H. TAYLOR.

SELECT METHODS IN THE ADMINISTRATION OF NITROUS OXIDE AND ETHER. By F. HEWITT, M.A., M.D., Lecturer on Anæsthetics at the London Hospital, etc. London: Balliere, Tindall & Cox, 1888, pp. 48.

The appearance of this little book is one of many indications that the study of the administration of anæsthetics is receiving at length more of the attention which it deserves, both as regards the instruction of students in anæsthetic methods and the general operations of surgery.

In less than 50 pages Dr. Hewitt gives clear and succinct directions for the administration of ether by Clover's inhaler, of nitrous oxide by the usual method, and of combinations of the two anæsthetics, either by administering "gas" to facilitate etherization, or employing a small amount of ether to prolong the narcosis of nitrous oxide. This latter

method, by which a few inspirations of ether or chloroform are given at the end of the administration of nitrous oxide, was described by Mr. Walter Tyrrell in the St. Thomas Hospital Reports for 1883, but has never received the attention it deserves. According to Mr. Tyrrell's experience, a drachm of Reprand's mixture (chloroform 4 parts, methylic alcohol, 1) serves for seven or eight dental cases, giving two minutes complete anæsthesia, while the patient is able to walk out of the room in five minutes. Dr. Hewitt prefers ether for this purpose, and counts on from 45 to 50 seconds of anæsthesia.

There can be no doubt but that in certain and special cases, the most satisfactory method of inducing anæsthesia, both from the patient's and the administrator's point of view is by means of ether preceded by nitrous oxide. The greater part of Dr. Hewitt's book is occupied by a description of an apparatus devised by the author by which this might be effected. The instrument consists mainly of the adaptation of a bag connected to the gas bottle, in place of the small bag of the Clover's inhaler, while a special valve placed between the ether vessel and the bag allows the patient to respire either air or gas at the will of the administrator. A somewhat similar method was described by Mr. Tyrrell in the article referred to above, but the author's apparatus appears rather more easy to manage. When the narcosis is complete the large bag is detached and its place taken by the usual small bag. The use of small light steel bottles instead of the cumbersome heavy iron vessels till recently in use for nitrous oxide renders it possible to carry a large quantity of the gas in very small space, and there seems no reason why this agent should not be more freely used in ordinary surgical practice for short operations, either with or without the addition of ether. Dr. Hewitt's book has no pretensions to a complete manual of anæsthetic practice, but will prove of great use to those who wish to adopt the "select methods" he advises.

ERNEST H. JACOBS.

HUETER-LOSSEN'S *GRUNDRISS DER CHIRURGIE*. Bearbeitet von Prof. D. HERMANN LOSSEN. 1. Band, Die Allgemeine Chirurgie vierte vollkommen umgearbeitete Arplage. Leipzig. F. C. W. Vogel. 1885. New York, G. E. Stechert.

HUETER-LOSSEN'S *PRINCIPLES OF SURGERY*.

The first volume of Hueter's work on surgery, edited by Lossen, of Heidelberg, containing General Surgery, is now before us in a thor-

oughly revised and to a great extent entirely re-written form, as its fourth edition.

To bring the book up to date and to put it on a basis conformable to the latest advances in scientific research, has rendered it necessary to alter the arrangement and teaching of the entire first part. And this aim has obviously been achieved. Instead of commencing with inflammation, as in the older handbooks, the editor now gives the first place to the normal process of healing of wounds, and afterwards discusses the various forms of inflammations, which naturally leads him to the subjects of bacteriology connected with surgery. From this it is but a step to surgical fevers and antiseptics, so that the first part represents an easy and unstrained logical progress of ideas. The more minute consideration of septicæmia, however, which would be more naturally introduced at this point, is postponed to the third department, where acute wound diseases are treated of, and the second part is now interposed, treating of the injuries and diseases of the various tissues. Tumors are discussed in a general manner in the fourth part. The second half comprises the general knowledge of operations and instruments (including a chapter on anæsthetics) and bandaging, appliances and protheses.

The teaching is everywhere concise, clear, and in keeping with the most recent accepted facts. It is not everywhere so detailed as might be wished, but this is again an advantage for students. The main maxims are given in italics, which adds to the clearness of the style. As to the scientific value of the matter taught, little need be said about it. Hüter's and Lössen's views are too well known and recognized to demand criticism, and there are but few points of pathology and the normal regenerative processes where other authorities opposed in their views can claim a greater number of followers.

LEHRBUCH DER FRACTUREN UND LUXATIONEN FÜR AERZTE UND STUDIERENDE. Bearbeitet von DR. ALBERT HOFFA. Würzburg, Stahel'sche Buchhandlung. 1888. New York, G. E. Stechert.

TEXT-BOOK OF FRACTURES AND DISLOCATIONS.

The author has collected the latest scientific researches on the subject of fractures and dislocations and embodied them together with what was formerly accepted, in the present volume (about 600 pages octavo), with the view of furnishing a practical hand-book for students. Although very complete in regard to all points of interest in the sub-

jects treated, the subject-matter has been confined to general statements, and, of course, no cases are introduced. Especial prominence is given to differential diagnosis and tables are introduced to facilitate differentiation. The treatment, however, has been purposely confined to the simplest and most practicable methods.

The most striking feature of the book is the illustrations; 335 woodcuts being interspersed in the text, many of them taken from well-known works and monographs, and 29 chromo-lithographs being added, showing the external appearance and the anatomical relations of the typical displacements in fractures and dislocations. The drawings were executed by Dr. Florschütz. This addition alone promises success for the book, which is well gotten up in other respects also such as in paper and typography.

COMPENDIUM DER LEHRE VON DEN FRISCHEN SUBCUTANEN FRACTUREN.
VON DR. STETTER (Königsberg). Berlin, Georg. Reimer. 1888.
New York, G. E. Stechert.

COMPEND OF THE SCIENCE OF RECENT SIMPLE FRACTURES.

This book (112 pages small octavo) is intended as a complement to the author's compend of recent dislocations, with which it is uniform. The principal facts and most desirable knowledge are given in few words, only enough of the theory of fractures being included to permit an intelligent diagnosis and treatment. The latter frequently favors the application of tow dipped in plaster-of-paris. Some woodcuts illustrate the text.

W. W. VAN ARSDALE.



Dr. Fowler's Case of Hernia of the Pleura into the Neck.

HERNIA OF THE PLEURA INTO THE NECK.

By GEORGE R. FOWLER, M.D.,

OF BROOKLYN.

SURGEON TO ST. MARY'S HOSPITAL; SURGEON TO THE METHODIST EPISCOPAL HOSPITAL.

THE little patient, the subject of the present report, was admitted to my service at the Methodist Episcopal Hospital on August 20, 1888, with the following history: Six months before when at the age of three months, having previously enjoyed good health, she was attacked with acute bronchitis, and suffered greatly from violent paroxysms of coughing. The attack gradually subsided, but in the meanwhile, the mother noticed a swelling upon the right side of the neck, which became larger when the child cried or coughed, and which almost entirely disappeared upon inspiration. This gradually increased in size, both at its base and in an upward direction, until in the course of a month it was found that a similar tumor had made its appearance upon the left side of the neck.

The patient upon admission presented the appearances shown in the accompany lithographic drawing. The child was poorly nourished, and was nursed from an anæmic mother, who was evidently furnishing an insufficient supply of nourishment, and that of an inferior quality. It presented two well marked tumors of the neck, one upon either side of the trachea, both of which, upon inspiration, nearly disappeared, but became full and tense upon expiration. The tumor upon the left side of the neck presented a soft protruding mass, beginning above at the lower border of the inferior maxilla, and extending below nearly to the border of the clavicle. The tumor upon the right side presented a similar but smaller protrusion. She had constant dyspnœa and was aphonic. The child was weaned and fed on peptonized milk.

Her general condition apparently improved until an attack of acute bronchitis supervened, which ended fatally in three days. I am indebted to Dr. Eugene Hodenpyl, Pathologist to the Hospital, for the very careful autopsy and accompanying preparation of the lungs, pleura, etc., and the following account of the post-mortem appearances: "The protrusions of the neck are but portions of an enormous sac, connected with the upper part of the right lung. When distended, it occupied a large part of the right pleural cavity and anterior mediastinal space between the thymus and pericardium. The tumor had passed out of the right chest and into the neck behind, and to the sides of the trachea and œsophagus as high as the jaw, extending posteriorly to the vertebral column. The portion of the sac on the left side had found its way into the upper part of the *left* pleural cavity, displacing the lung and costal pleura of that side side downward to the extent of two inches. The sac, which contained odorless air, and had thin, smooth, glistening, and transparent walls, had pushed its way behind the trachea and upward toward the anterior surface of the neck, until it had produced the tumors noted. It also completely surrounded the œsophagus as high as the lower border of the jaw. The trachea and larger bronchi are very much congested and contained muco-pus. There is a rupture of the primary bronchus, which enters the upper lobe of the right lung, affording direct communication with the cavity of the sac. The right lung is collapsed and lies in the bottom of the pleural cavity. The heart is somewhat displaced toward the left. The other organs show no lesions."

As will be seen by the above description of the anatomical appearances, the tumors were the result of a rupture of the primary bronchus in the upper lobe of the right lung. The air escaping underneath the pleura, stripped it from its pulmonary attachments. As the sac thus formed forced its way through the apex of the pleural cavity, its walls were reinforced by the costal pleura. As it ascended into the neck, it was still further reinforced by the deep fascia of the neck. Passing behind the trachea and around the œsophagus, it formed the tumor upon the left side of the neck; this, descending, forced before it, in turn, the deep fascia of the neck

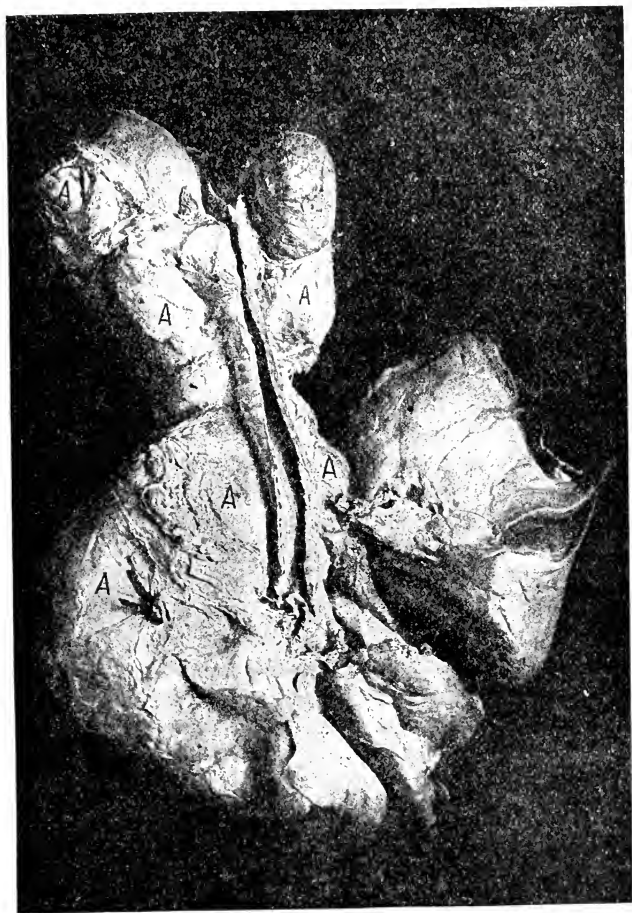


FIG. 2.—TRACHEA AND LUNGS, WITH DILATED PLEUROCELE AS SEEN FROM BEHIND.
A. A. A. A. PLEUROCELE.

and costal pleura of the left side, finally entering the pleural cavity on this side.

The subject of air tumors of the neck has been very carefully studied recently by Dr. L. H. Petit, in a paper read before the *Congres Français de Chirurgie*, in March of last year. Petit describes but two pathological conditions constituting "aérocele" of the neck, although in his paper he speaks of the latter as being "presented in four very distinct forms." As a matter of fact, however, as before stated, but two pathological forms of this affection are described: First, a perforation of the mucous membrane of the trachea may lead to a diffused emphysema of the neck. Second, there may occur a herniated condition of the mucous membrane of the trachea, which is forced into the structures upon the side of the air-tube further and further, thus constituting a true air tumor of the neck. This, upon inspiration, becomes lessened, and increases upon expiration. Compression may also temporarily reduce its volume. Closure of the connection between this hernial sac and the cavity of the trachea may prevent the reduction by compression, and render the tumor more or less resistant to pressure. This true air tumor of the neck may be converted into a diffused emphysema by rupture of its walls. Petit's description of "four distinct forms" therefore, resolves itself into the two conditions above described. He had evidently searched the literature of the subject very carefully, but can scarcely be said to have added anything new to our knowledge upon the subject.

P. Fabre, describes¹ a case of so-called air-tumor of the neck, which he observed in a child about a day old. This consisted of an air diverticulum in front of the neck and at the superior middle portion of the thorax. When the child cried the diverticulum would become filled with air, which latter disappeared upon inspiration, leaving a marked depression. The child when last seen was fourteen months old, and the condition described still existed. One must infer from Fabre's description of this case, that the child was the subject of congenital fissure of the sternum. Otherwise it is difficult to con-

¹Gaz. Med. de Paris, 1886, 7th sér, LVII, 374.

ceive of a tumor of the character mentioned existing at the "superior middle portion of the thorax," without either fissure or entire absence of the sternum or ribs.

Most careful search of the literature of this subject fails to reveal a description of the condition herewith presented or anything analogous to it.

I am indebted to Dr. Prudden, Curator of the Museum of the College of Physicians and Surgeons, New York, for the opportunity of studying in connection with this subject, a specimen taken from an infant a few days old, who died of acute bronchitis. In this case, a rupture of a bronchus in the upper lobe of the lung occurred, with stripping of the pulmonary pleura from its attachments. This constitutes a condition which primarily occurred in my own case, and had the child lived, it would, in all probability, have presented another example of hernia of the pleura into the neck.

SIMULTANEOUS LIGATION OF THE COMMON CAROTID AND SUBCLAVIAN FOR ANEURISM OF THE ASCENDING AORTA.

By F. T. MERIWETHER, M. D.,

OF ASHEVILLE, N. C.

SURGEON TO MISSION HOSPITAL.

UPON Oct. 24th, 1888, I was called to see a patient, Mrs. P., æt. 35 years, white, who was suffering from great pain in the upper portion of the thorax, principally upon the left side. Patient had suffered with more or less pain in the upper left thorax for two or three years. Upon Oct. 19th, 1888, while walking up a hill, she was seized with short, sharp, sudden pain in the entire upper thorax, with faintness and palpitation. The pain getting worse, she sent for me. I found patient in bed, feeling fairly comfortable while lying down, but upon rising the pain increased, and as she expressed it she had "an indescribable feeling all over."

Inspection upon lying down reveals pulsation at the root of the neck only, but upon sitting up a slight pulsation in the 2nd right costal interspace. Upon palpation an aneurismal thrill was distinctly felt, more or less diffused over the chest walls but felt most distinctly over a space about three inches in diameter and extending from 2nd right interspace upward. Pulsation distinctly felt in 1st and 2nd right interspace. Upon stethoscopic examination a well-marked aneurismal bruit was heard with the greatest distinctness in the 2nd right costal interspace close to the sternum, transmitted along the carotid and subclavian arteries. This bruit was more or less diffused over entire chest walls. There was some tenderness over the upper portion of the sternum, percussion giving slight dulness over a space of about two inches in diameter and extending from one

inch below the superior extremity of the sternum downward to the right. Some shortness of breath and heart palpitation upon moving around. The radial pulse was apparently not impaired, being synchronous as well as could be determined; there being no sphygmograph at hand. There was some little laryngeal irritation, enough to produce a slight cough, and a feeling of rawness in the throat upon swallowing.

The pupil of the right eye was somewhat contracted and the vision of that eye was impaired. Drummond's sign of a systolic puffing upon stethoscopic auscultation over the trachea proved of no value in this case.¹ An apparent puffing was heard, but upon careful examination it was found to be produced by the obscuring of the tracheal respiration by the loud bruit, thus giving an apparent intermittency in the respiration. It is possible, however, that in a larger aneurism, and one in a different position, more or less stenosis of the trachea might be produced and in that way give rise to the puffing spoken of. For the past six or eight months the patient had been much annoyed by a buzzing in her right ear, and for the past few weeks she had noticed a stiffness and soreness in the right cervical region. The patient was a multipara, the last child being about 3 years of age, and she gave no history of syphilis. She worked at a loom in a cotton mill. Her two aunts, two uncles and a grandmother upon her mother's side had died suddenly from some heart lesion. Her father had died from acute tuberculosis. For the last few weeks the patient had suffered from asthma at night.

I put her upon the iodide of potassium and tincture of digitalis, the action of her heart being very irregular and tumultuous, limited her diet and tried to follow out Tüffnell's method. Upon Oct. 28th, on more careful auscultation a mitral regurgitant and an aortic stenotic murmur was heard. She had spat some blood, probably however from a laryngeal or tracheal irritation. The pulsation was more distinct and was felt with the thrill along the right carotid and subclavian quite distinctly; less so in the left carotid and subclavian. She complained of great pain in her back, deafness in the right ear

¹Gross' Surgery—Aneurism of the Aorta.

and pain and difficulty in swallowing. The right pupil was more contracted, and the right radial pulse was a little weaker and behind the left. Finding the aneurism apparently increasing in size, being about 3 $\frac{1}{2}$ inches in diameter, and probably involving the innominate, I decided to operate. This I did upon Nov. 3d, at the Mission Hospital of this city, assisted by the staff. Chloroform was given, but she took it so badly that ether was substituted, failure of respiration repeatedly recurring with the chloroform.

The incision for the common carotid was made as usual, but the omohyoid muscle rising higher in the neck than usual, I found it expedient to tie the vessel nearly half an inch below the muscle. The artery was exposed by drawing the sternomastoid muscle outwardly and the sterno hyoid inwardly, thus showing it nicely in its sheath. The descendens noni was just upon the artery, but it was held aside while the ligature was passed from within out. The internal jugular vein was not seen. The subclavian was tied in its third part, just beyond the scalenus anticus muscle. It was placed quite deep in its bed here and had to be raised up some little distance before the ligature could be tied.

The external jugular and a net work of small veins crossed the middle of the incision, but by careful working none were cut. The jugular was dissected out and drawn to the inner side of the incision. The brachial plexus was not seen, nor was any thing of importance except the artery. Catgut was used to ligate, and the incisions were closed with light catgut. No blood was lost during the operation, the sponges being hardly discolored. Iodoform and iodoform-gauze were used as a dressing. Antisepsis was strictly observed. Time of operation one hour and a half. The patient rallied well from the operation, but she suffered great nausea during the night. At 9 A. M. on Nov. 4th, the patient was easy but she felt a little heaviness in the right arm. Circulation was good and well established. The pulse in the left arm is a little increased, and a distinct pulsation is felt over the abdominal aorta, upon palpation. Pulse 100; temperature normal.

There was no rise of temperature during the after-treatment and the pulse went down on the 3rd day to 80; on the 4th day

a small abscess formed at the root of the lower right canine tooth and ruptured, the tooth being decayed. Not a bad symptom appeared, no sign of cerebral anæmia, the only thing complained of being a little weakness in the right arm. All the subjective symptoms present before the operation had disappeared. The dressing was removed upon the tenth day and everything found united. No sign of pus, the dressing not even being stained. The pulsation in the root of the neck and in the 2nd interspace had diminished somewhat, and from this time on grew less and less. The patient got up on the twelfth day and left the hospital on the seventeenth day after operation. She was ordered a syrup of the hypophosphites and gained strength every day. Nineteen days after the operation the pulsation could hardly be felt and then only by deep, firm digital pressure in the supra-sternal fossa. No thrill present.

On the twenty-seventh day after operation no pulsation could be felt, but a slight systolic bruit could still be heard over the ascending aorta, being confused and lost in the aortic stenotic murmur. The abdominal pulsation had disappeared and the only thing abnormal was a slight increase in the pulsation of the left carotid, that being a compensative hypertrophy and dilation. Patient discharged as cured with directions to report every month or two, or upon anything abnormal happening.

According to Wyeth this operation has been performed six times, this making the seventh for aneurism of the aorta diagnosed previous to the operation. Maunder's patient died on the fifth day from recent clot projecting into the aorta; Heath's patient lived 4 years, death resulting from bursting of the sac. Barwell's patient lived fifteen months; Lediard's ten months; Hobard's sixteen days, dying from hemorrhage at the seat of ligature on the carotid; Wyeth's patient living one year and dying from acute diarrhœa. Of these Wyeth's, Barwell's and Lediard's may be called successes, as the cause of death was not traced to either the aneurism or the operation. These including my case would give seven operations, with a mortality of 43%. This mortality is much less than that given in our text books. This operation is practically in its infancy,

the great mortality being due to delay in operation. So it has been with all operations, the results getting better, as we see the necessity of early operation. Very few patients are willing or able to go to bed for two or three years, even if we concede that the iodide of potassium, reduction of diet, etc., is of service. And this I doubt. Most cases of aortic aneurism which we see reported as cured by the iodide of potassium are said to be about the size of a walnut or smaller, and I hold that a mistake in diagnosis is very liable to occur here. There must always be an uncertainty in the diagnosis of so small an aneurism and it is not improbable that the results of this treatment should be modified.

If taken in time, by this operation, hope may be given the patient of a cure, and I think as our knowledge and study of surgery progresses that the operation will not be so rare or formidable as now. Of course it should never be undertaken by one faulty in his anatomy or in his surgery, and antisepsis must be thoroughly carried out.

A HITHERTO UNDESCRIBED ANOMALY OF THE LINGUAL ARTERY.

By FRANCIS J. SHEPHERD, M.D.,

OF MONTREAL.

PROFESSOR OF ANATOMY IN MCGILL UNIVERSITY, SURGEON TO THE MONTREAL GENERAL HOSPITAL.

WHILST operating on the dead subject a couple of years ago one of the members of my class cut down in the usual way upon the lingual artery of the left side but failed to find it. The incision was a curved one, having the greatest convexity of the curve reaching to the middle of the great cornu of the hyoid bone, it being the intention to reach the artery in its course beneath the hyoglossus muscle in the angle formed by the posterior belly of the digastric muscle and hyoid bone. After carefully searching for the artery and failing to find, I enlarged the incision downward, in the line of the carotid, and discovered the missing vessel. It was given off, in common with the superior thyroid, opposite the upper border of the thyroid cartilage, from here it passed upward and inward, toward the median line of the neck, resting upon the thyro-hyoid muscle; it crossed the hyoid bone internal to the lesser cornu, almost immediately pierced the hyoglossus muscle, and from thence onward to the tip of the tongue its course was normal. At the usual situation of the origin of the lingual was a very small branch which ended in the hyoglossus muscle.

This is a rare anomaly and one which surgeons, who are in the habit of ligating the linguals before excising the tongue, should be acquainted with. Except the lingual artery be absent, or be supplied by the internal maxillary (extremely rare conditions) its relation to the great cornu of the hyoid bone is very constant, even if it should be given off from the external carotid above or below its normal point, or arise in common with the facial or superior thyroid arteries. In this case I was

much puzzled and thought that the artery was absent until a dissection of the neck revealed the displaced vessel.

This anomaly originates, doubtless, from the enlargement of the normal hyoid branches of the lingual and superior thyroid arteries and a consequent diminution or, rather, disappearance of the main trunk of the lingual. The enlargement of already existing anastomotic branches is the not infrequent cause of

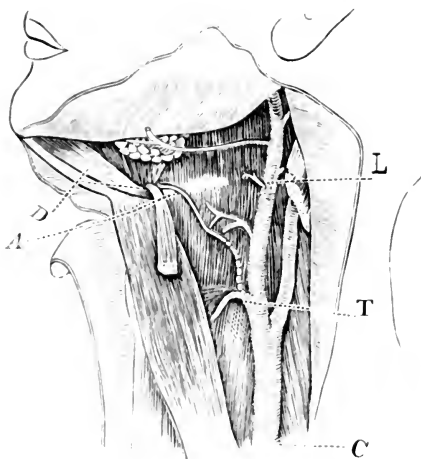


FIG. 1.—ANOMALY OF THE LINGUAL ARTERY.

The vessel may be seen arising from the superior thyroid and passing up over the hyoid bone to pierce the hyoglossus internal to the lesser cornu. A, Abnormal lingual. D, Digastric muscle with posterior belly turned down. L, Small branch given off in the normal position of the lingual. T, Superior thyroid artery giving origin to the abnormal lingual. C, Common carotid artery.

anomalies of arteries, the most familiar example being the derivation of the obturator from the epigastric, owing to the enlargement of the anastomosing pubic branches. The anomaly above described for the first time must be very rare. Quain, on the arteries, does not mention it, nor does Zuckerkundt, in his anomalies of the lingual artery. And I, myself, with a dissecting room experience of many years, and notes on over three hundred subjects, have never seen a similar arrangement.

EDITORIAL ARTICLES.

INJURIES OF THE HEART.

Injuries of the heart are usually considered so little amenable to surgical interference that they receive but little attention in surgical literature. It is believed that a further advance may at some future time include this organ in the number of those subject to surgical action. In order to increase the amount of the available data bearing upon this subject, the following recent cases are presented without other remarks than may have been made by the operators.

CASE I. *Perforating Stab Wound of the Heart ; Recovery.*¹—A Caucasian Cosack, in a drunken fight with a comrade, was stabbed in his chest with a dagger, the accident taking place on the street, close to Dr. Kravkoff's lodgings. Having instantly arrived at the spot, the author found the man lying on the ground in a formidable pool of blood, deadly pale, in an insensible state, with stertorous breathing. He was still profusely bleeding from a clean-cut transverse wound, $1\frac{1}{2}$ inch long, situated in the left 4th intercostal space, 1 cm. above the nipple, on the mammillary line. The hæmorrhage was at once stopped by means of a compressing bandage. Under the influence of analeptics, the man soon recovered his senses, and could be, without delay, carried to a casualty station. On a closer examination on the next morning the cardiac dulness proved to be considerably enlarged both vertically (reaching upward to the 4th and downward to the 7th rib) and horizontally (from the right parasternal line to a point $1\frac{1}{2}$ finger's breadth outside of the mammillary line). When the patient lay on his back, the cardiac dulness became narrowed; when on his right side, the left border of the dulness receded toward the right, and when on his left

¹Dr. A. P. KRAVKOFF (Riazan, Russia) in the *Russkaia Meditsina*, No. 42, 1887

side, the right border receded toward the left. The apex-beat was neither visible nor palpable; the pulse (90) weak and small; the cardiac sounds indistinct, especially the systolic, which was replaced by "a gurgling murmur," heard most distinctly about the apex in the 6th interstice. Taking all the facts into consideration, Dr. Kravkoff came to the conclusion that he had to deal with a perforating stab wound of the pericardium and the anterior wall of the left ventricle, with consecutive hæmo-pericardium. In a couple of days the man's general state was thought to be sufficiently strong to safely permit his removal to a lazaretto near by. After a four weeks' stay he was discharged quite well and at once joined his regiment to resume the Cosack's usual duties. About five days after the discharge the unhappy man (human life being the cheapest article in Russia) was ordered to perform some severe task, and when attempting to lift up a heavy object from the ground fell, as if struck by lightning, and instantly died in slight convulsions. At the *post-mortem* examination, Dr. Kravkoff found the cutaneous wound healed by a firm scar of a bluish color. The parietal layer of the pericardium was adherent to the thoracic wall, while the pericardial cavity was distended by two tumblerfuls of dark fluid blood. On the anterior wall of the left ventricle there was present a transverse rent penetrating through its whole thickness and measuring ¹/₂ inch in length, the serous edges of the rupture being thickened from the proliferation of fibrous tissue, while the muscular ones all round presented fatty degeneration and atrophy of muscular fibres. The papillary muscles and chordæ tendineæ of the mitral valve were shrunken and shortened from a recent localized endocarditis. Analyzing this highly remarkable case, Dr. Kravkoff justly concludes that (1) his diagnosis, as established during the patient's life, was quite correct; (2) that the formidable lesion of the heart had completely healed; and (3) that death followed from the young scar giving way under the influence of a sudden violent increase of the intra-cardiac pressure, caused by a powerful muscular effort.

CASE 2. *Gun-shot Wound of the Heart; Survival for 10 days.*¹

¹Dr. TCHEKUNOFF (Nijni Tchirskaia Stanitzza Russia), in the Proceedings of the Don Medical Society for 1887.

—A boy, æt. 3 years and 10 months, was accidentally shot, the patient standing 1 foot from the weapon. The wounded boy remained erect at the spot for about 5 minutes, and then lost consciousness and fell down, bleeding from the wound. The hæmorrhage was soon arrested with fingers by his father. Having arrived one-half hour later, Dr. Tchekunoff found the child still unconscious, lying on his back, with cyanotic face, cold limbs, irregular, scarcely perceptible breathing, and filiform pulse. About 1 cm. above the right nipple, between the 3d and 4th ribs. there was seen an irregular wound, measuring 1 sq. cm., from which blood was oozing drop by drop, and which admitted a probe only for 1 cm. Under the influence of analeptics, the boy recovered his senses in one-half hour and was able to relate the accident. From the 3rd day there appeared febrile movements (38° - 39° C.) and acceleration of breathing (70-80 per 1'), while from the 4th there supervened symptoms of ascending pneumonia gradually invading the whole right lung, and on the 5th day albuminuria. The boy complained of pain about the wound. But the cardiac sounds and rhythm remained quite normal all through, and the boy's general state was fairly satisfactory up to the 9th day. Later on, the pulmonary symptoms rapidly grew worse, cyanosis increased, there appeared progressive prostration, and on the 11th day the child died. Up to the 8th day the pulse had been from 64 to 88; and only later rose up to 112. At the *post-mortem*, on the outer surface of the pericardium there was found a piece of the boy's jacket sticking to a scar underneath. The pericardial cavity contained a little bloody serum, while on the anterior wall of the left ventricle there was seen an obliquely running groove, at the inner extremity of which a bullet, weighing 30 grains, was embedded. Otherwise the heart was healthy. Dr. Tchekunoff had not suspected the cardiac lesion during the child's life, since the cardiac rhythm and sounds had not presented anything abnormal. The relative slowness of the pulse during the first seven days is ascribed by him to "an irritating action of the foreign body on the inhibitory apparatus of the heart."

CASE 3.—*Gunshot Wound of the Heart. Death from Phthisis on the 158th day.*—A middle aged policeman was found after midnight,

Dec. 30th, lying on the pavement in an unconscious state, about three hours after having been shot by an unknown person.¹ He recovered his senses on the way to the Irkütsk Town Hospital and was even able to ascend a stair-case, with some support, but he could not speak and only groaned from agonizing pain about the left side of the chest. On examination, there was detected a bullet wound, situated at the junction of the 5th left rib with the sternum and giving vent to air and bloody foam on respirations. There was, further, an intense subcutaneous emphysema over the whole left side of the thorax. The breathing was quickened, the pulse irregular and weak, the temperature subnormal. The man was very pale, complained of pain and occasionally coughed, expectorating scanty sputum slightly tinged with blood. The cardiac sounds were weak, but clear at the time. Dr. Zisman ordered absolute rest, ice externally and internally, valerian, brandy or sherry, morphine or codeine, milk diet and iodoform gauze dressing. In the course of the first 15 days the man gradually greatly improved; pain, bloody expectoration and emphysema disappeared, the pulse became normal, he slept and ate well, and markedly gained strength, his subjective feeling remaining excellent. On the 12th day, the bullet could be felt embedded amidst the muscles posteriorly, about the middle of the left 6th rib. On the 15th, there were first heard slight systolic and diastolic murmurs at the cardiac apex as well as along the large vessels, while the cardiac dulness proved to be somewhat enlarged transversely. On the 16th day, there suddenly occurred giddiness, dyspnœa with profuse perspiration, and paralysis of the left leg which in a few days became deadly pale, cold and excessively painful. On the 20th day, it became evident that the leg was affected with dry gangrene. On the 21st, an epileptoid fit occurred, to be followed by an ascending dry gangrene of the right leg, too. About the 35th day, the demarcation lines were found quite distinct on both sides (on the right, across the knee; on the left, about the upper third of the leg). The patient suffered from pain and mild fever, sleeplessness and loss of appetite, and was rap-

¹DR. L. S. ZISMAN (Irkütsk, Siberia) in the Proceedings of the Irkütsk Medical Society for 1887.

idly losing flesh and strength. In view of the latter circumstance as well as in view of the patient incessantly imploring to cut off his dead limbs, it was decided to perform the operation (and that under chloroform, since the pulse was quite regular). On the 44th day, Dr. Zisman, assisted by six colleagues, made the amputation of the left thigh about its lower third, after which Dr. Solonoff amputated the left leg below the knee. The operations lasted 78 minutes; the patient bore everything fairly well. In a few days, however, in both of the stumps there appeared a partial gangrene of the soft tissues, the sloughs falling away one on 64th, and the other on the 74th day, after which a healthy cicatrization set in. But the patient's state did not improve at all. On the contrary, a fulminant pulmonary and intestinal tuberculosis developed to end in death on the 158th day after the accident. The post-mortem examination showed that the bullet had perforated the anterior thoracic wall, entered the pericardiac cavity, made a deep groove, about $1\frac{1}{2}$ finger's breadth long, in the anterior and adjoining outer wall of the left ventricle, afterward pierced the outer wall of the pericardial sac and went through the whole thickness of the left lung to bury itself amidst the spinal muscles at the already mentioned spot. The anterior portion of the pericardium was found firmly adherent to the thoracic wall in front, to the heart behind. The bullet track from the entrance to the heart was represented by a very dense cicatricial cord, and the pericardial entrance and exit points by oval holes of the size of a big pea, with smooth cicatricial edges. The bullet groove in the heart was filled up with firm connective tissue; at this spot, almost the whole cardiac wall consisted of the cicatricial tissue alone, only a very thin muscular layer remaining from the myocardium, while the subjacent endocardium was extremely thickened and dense. The left lung was extensively adherent to the anterior thoracic wall. The pulmonary apices were occupied by large cavities with purulent and caseous contents. The intestines presented a number of tuberculous ulcers. Concluding the description of his highly remarkable and instructive case, Dr. Zisman emphasizes the circumstance that "his patient, having completely recovered from a formidable lesion of the heart, succumbed from phthisis which had developed on the ground of a prolonged profuse suppuration."

CASE 4.—*Traumatic Rupture of the Heart (Septum Ventriculorum).*¹ This is the fourth recorded case of the kind. The other three are: 1. Giraldes' case of a boy, æt. 12, who fell from the top of a house and died in 4 hours from the rupture of the upper portion of the healthy septum. 2. Prescott Hewitt's case of a child of 5, who got under the wheels of a vehicle and died in $\frac{1}{2}$ hour from the rupture of the healthy septum at the junction of the middle third with the lower; and 3. Markham's lethal case of rupture of the septum, caused by a fall from an omnibus' top. A powerfully built, always strong and healthy railway shunter was caught between two buffers. When seen shortly after the accident, he was in a semiconscious state, prostrate, pale, suffering from extreme dyspnoea as well as thoracic and epigastric pain, his lips being cyanotic and the pulse weak, small, irregular, uncountable. Auscultations revealed the presence of a loud continuous murmur replacing both the systolic and diastolic sounds; the sounds of the aorta and pulmonary artery were also obscured by murmurs. The pain was especially severe and intensified by pressure along the left axillary line, between the 6th and 8th ribs. No external injuries were visible. The urine contained albumen, leucocytes and red blood corpuscles. Very soon there supervened hæmoptysis, a steadily increasing extreme cyanosis, and crepitant râles over the lungs, while dyspnoea continued to grow worse and the cardiac murmurs became ever louder (could be heard not only anteriorly, but also posteriorly and through the lateral thoracic wall). (Edema was absent. The man remained all the time in a semirecumbent posture (with his feet hanging down), visibly avoiding any slightest alteration in his position or any movement in general. On the 15th day he died from pulmonary œdema. At the *post-mortem* examination, the pericardium was found to contain 2 ounces of sanguinolent fluid. The heart measured $13\frac{1}{2} \times 13 \times 5$ cm. There were three echymoses on its anterior wall. The auricles and left ventricle were filled up with clots. In the septum ventriculorum, close to the cardiac apex, there was present a perforation which freely admitted a finger and had rounded off edges. The

¹DR. GAVREL I. POIOFF (St. Petersburg) in *Ejenedelnaia Klinitcheskaia Gazeta*, Nos. 9, 10 and 11, 1888.

thickness of the septum was about 3 or 4 millim., that of the left ventricular wall 12 millim. The muscular substance as well as the valves, and intima of the aorta were quite healthy. There were found, further, ruptures of the spleen, lungs and kidneys. Discussing the mechanism of the lesion, Dr. Popoff comes to the conclusion that the rupture took place during the early period of a cardiac systole, when the ventricles were filled up with blood *ad maximum*, and the cardiac muscle was in a contracted state. The systolic rise of the intracardiac tension was suddenly highly increased by a violent compression of the chest between the buffers. The blood tension in the left ventricle being greater than in the right one, the compressed mass of blood forced its way from the former toward the latter through the septum at a comparatively thinner wall, the left ventricle's walls being somewhat hypertrophied from his heavy professional work.

CASE 5.—*Traumatic Rupture of the Heart (Right Ventricle)*.¹ A male peasant, æt. 50, while lying drunk on the pavement near his hut, was violently struck in the chest with a clenched fist by another peasant. The patient hurriedly rose up, shouted loudly, "you beat me!" and stepped into the hall of his hut to die 15 minutes later. At the necropsy, there was found a recent superficial quadrangular excoriation over the ensiform cartilage, measuring $4\frac{1}{2} \times 1\frac{1}{2}$ cm. The pericardium was distended with fluid blood and scanty flabby clots, while on the posterior surface of the right ventricle, just above the apex, there was present an irregular, slightly gaping rent, 1 cm. long, penetrating into the cavity of the ventricle, its edges being œdematous. The adjacent visceral pericardial layer showed an ecchymosis of the size of a shilling piece. The cardiac muscle was somewhat enlarged, flabby, pale and yellowish, the venous valves slightly cartilaginous, the cavities empty. Dr. Bryzgaloff draws attention to the facts, (1) that traumatic rupture of the heart occurs but very rarely; at all events, by far less frequently than that of the liver, spleen, kidney or lung; (2) that traumatic rupture of the right ventricle occurs by far more rarely than that of the left one (of 51 cases of cardiac rupture, collected by

¹DR. BRYZGALOFF (Kostroma, Russia) in the Proceedings of the Kostroma Medical Society, June 23, 1888.

Fischer. Only 4 refer to the right ventricle); (3) that in his case there were present such predisposing causes as fatty degeneration of the muscular substance with hypertrophy of the heart and thickening of the valves, increased cardiac action and intracardiac pressure under the influence of alcohol; (4) that the rupture took place during an early stage of a systole, since there was present a pericardial ecchymosis which evidently had resulted from violence having occurred at the moment when the heart had been as near as possible to the thoracic wall; (5) that the fatal issue was caused by the heart having been compressed and arrested by the blood extravasated into the pericardial sac.

VALERIUS IDELSON.

THE TREATMENT OF CEREBRAL ABSCESS.

At a meeting of the Berlin Medical Society, Dec. 5, 1888, Professor von Bergmann presented a patient on whom he had successfully opened the cranial cavity for the evacuation of a previously diagnosed abscess. He stated that cerebral abscess was never a primary disease, but always secondary, and so a sequence to some antecedent trouble. These pre-existing troubles always exist, and are often markedly characteristic. The so-called idiopathic abscesses are usually the products of cerebral tuberculosis, though tubercular deposits appear as a rule as dry caseous masses, and rarely go on to the formation of sufficient pus to give rise to the symptoms of abscess.

There are three disturbances which precede the formation of abscess in the substance of the hemispheres. These are 1. Purulent processes in and around the cranial bones. 2. Injuries of the soft parts, of the bones of the skull, and its contents. 3. Suppuration in the course of the lesser circulation, such as abscess of the lung, foetid bronchitis, severe and protracted empyema.

Among these three etiological factors, suppuration in the mastoid, this media suppurativa plays the most important part and is responsible for nearly one half of the cases.

The greatest number of cases of cerebral abscess, consequent to

chronic suppuration of the ear, are situated at some distance from the original centre of suppuration, and lie deep in the substance of the brain. Their seat is in the white substance and they are covered by unaltered gray matter. Barr collected 76 cases of cerebral abscess secondary to suppurative otitis. In 55 of these cases, the abscess was situated in the temporal lobe; in 13, in the cerebellum; in 4, both in the brain and cerebellum; in 2, in the pons, and in one case in the crura cerebri. The place where the abscess is situated depends upon where the original suppuration began in the ear. If it began at the upper surface of the petrous bone, the tegmen tympani, the temporal lobe will most probably be the seat of the abscess, if on the contrary the pus occupies the cells of the mastoid, the probabilities are in favor of an abscess in the cerebellum. Brain abscesses manifest themselves by three sets of symptoms. 1. Those which are characteristic of pus formation in the body. 2. Those of increased cranial pressure, which, however, are not present in small abscesses. 3. Disturbances in the function of the affected part of the brain.

The last group of symptoms is important in the localization of the lesion

The case presented by Prot. Bergmann was as follows:

The patient, a thin and somewhat anæmic turner, aged 29, had suffered since his 15th year from a purulent discharge from the right ear, which gave him little trouble, but varied in quantity from time to time. During the three weeks preceding his admission to the hospital the patient suffered from severe earache accompanied by attacks of dizziness. He felt tired and sick toward evening, lost his appetite and experienced frequent feelings of heat and cold. For the last few days he complained of a continuous headache which was so severe that it prevented him from sleeping; this headache was most marked on the right side. When admitted to the hospital he appeared apathetic and only answered questions with great difficulty, and was scarcely able to raise his head. There was slight icterus, tongue thickly coated, temperature 39.7 C., respiration 24, pulse 50 to the minute. When the patient was requested to raise his arms, the left sank down rapidly, while the right remained in the desired position. During the examination

there were spasms of the muscles supplied by the facial nerve on the right side. No deviation of the tongue, pupils normal.

In the right auditory meatus there was plenty of foul smelling pus; when this was removed, the cavity was found filled with easily bleeding granulations. Bare bone not to be found by the probe. Mastoid process is not swollen or tender on pressure, exploration of the granulations painful. Hearing almost completely abolished in this ear. Percussion over a circumscribed area, on the right side, covered by the pinna is intensely painful.

There could be no doubt that this was an acute exacerbation of an old chronic process. Suppuration of the mastoid was excluded on account of the absence of pain on pressure, swelling and cutaneous cedema.

All the above mentioned symptoms pointed toward an abscess of the brain, and one seated in the temporal lobe. A positive diagnosis was inadmissible as positive symptoms pointing to the destruction of the temporal lobe were missing; nevertheless a large part of that lobe may be destroyed without interfering markedly with the functions of the brain. In a general way it may be assumed that large abscesses in the temporal lobe increase the pressure in the entire cranial cavity by increasing the tension of the cerebro-spinal fluid. But this pressure is also transmitted through the semi-solid brain substance, though in a less uniform manner, so that the cerebral areas in the immediate neighborhood of the temporal lobes are more involved than those situated at some distance. The disturbances of motion and sensation which occurred on the patient's left side pointed to disease of the right hemisphere, and the symptoms of intracranial pressure, especially the slow pulse, showed that the abscess had reached a considerable size, and the author judged best to perform an early operation.

If a tangent be drawn from the posterior border of the auricle, and another from the highest point on its superior border, the lines will meet above and somewhat anteriorly to the posterior inferior angle of the parietal bone. In this space a large square of bone was removed by means of the chisel. The dura, when exposed, pulsated distinctly and appeared normal. When it was incised the extremely soft cerebral

substance was forced out; an incision into this gave blood but no pus. The knife was introduced three times before the abscess was found; it was situated somewhat anteriorly to the wound; the abscess contained about 30 cc., of greenish-yellow foetid pus. Digital examination revealed a smooth cavity surrounded on all sides by soft tissue. The cavity was carefully filled by iodoform ether, and a drainage tube introduced about 1 cm. Around the drainage tube iodoform gauze was loosely packed. The operation was performed under the strictest antiseptic precautions, and all bleeding points were immediately secured.

After the evacuation of the pus, the pulse at once rose to 54, and four hours later it was 88 to the minute. When the patient emerged from the narcosis he stated that his headache had entirely disappeared, and it has not returned since.

The dressing was changed daily, and the drainage tube shortened on the 9th day. The whole progress of the case was extremely favorable, no headache, no fever, no hernia cerebri, and in less than six weeks the wound was completely cicatrized.

The patient has yet a slight purulent discharge from his right ear, but this is being treated with astringent and antiseptic measures. The granulations in the cavity of the tympanum have been removed with a sharp spoon, and the surface cauterized. Prof. Bergmann proposes to keep the patient in the hospital until his ear trouble has been perfectly cured.

F. C. HUSON.

CANCER OF THE LARYNX.¹

Cancer of the larynx is very ably reviewed by M. Baratoux in a series of articles in the *Progres Medical*. A historical sketch is prefixed containing references to all the important publications on the subject, from the early observations of pre-laryngoscopic days to the present time. As to the frequency of malignant disease of the larynx it cannot be considered great. Krishaber recorded 50 cases, Morell

¹Cancer of Larynx. By M. J. BARATOUX. *Le Progres Medical*, May, June and July, 1888.

Mackenzie 53, and Ziemssen 70, while Fauvel could only collect 40 cases in his clinic, among 12,360 patients. Epithelioma is much the most frequent variety. Baratoux has been able to put together 239 cases of cancer, in which the diagnosis was clearly established. Of these 239 cases, 185 were epitheliomatous, which gives a ratio of 77 per cent. Only 3 of these cases were of the cylindrical type, the rest being of the squamous variety. Of the other forms of cancer encephaloid is much more frequent than scirrhus. Sarcoma occurred 12 times in 161 cases, or in about 7.5 per cent. Spindle-celled sarcoma is the most frequent.

As to the seat of cancer, in 167 cases the growth was situated within the laryngeal cavity, *intrinsic*, in 117, and on the epiglottis or parts around the upper orifice of the larynx, *extrinsic*, in 50. Of the 117 intrinsic cases the situation was: Ventricular bands 62, vocal cords 29, anterior commissure 8, subglottic region 8, posterior commissure 6, ventricles of Morgagni 4. Of the 50 extrinsic cases: Epiglottis 32, arytenoid region 9, ary-epiglottic folds 8, sinus pyriformis 1.

Men are much more frequently affected than women. In 46 cases of sarcoma, 40 were men, in 301 cases of cancer proper 265 were men.

M. Baratoux dwells at some length on the symptoms, laryngoscopic appearances and diagnosis of cancer of the larynx. It would be difficult, and would probably serve no useful purpose, to summarize his remarks, which however will well repay perusal in the original. As to duration, it varies with the nature of the tumor and the surgical interference. Sarcoma is slowest in its progress. Encephaloid is quickest and has most tendency to invade neighboring parts. Patients with encephaloid live on an average $2\frac{1}{2}$ to 3 years (Fauvel, Lablinski); those with epithelioma hardly more than 4 years.

TREATMENT.—*Endolaryngeal Removal.* This method is not relied on. Recurrence is almost certain. It is rarely done except through an error of diagnosis, the operator thinking he has to deal with a simple papilloma. At best its use must be confined to cases of pedunculated sarcoma at the upper orifice of the larynx, or of cancer strictly limited to the epiglottis.

Laryngotomy. This operation consists in dividing the thyroid car-

tilage in the middle line, and separating the two halves, the cricoid cartilage and thyro-hyoid membrane being divided also if necessary. The growth is removed by knife, scissors or cautery. This operation may be termed *total laryngotomy*, in distinction from partial laryngotomy, which may be performed above the thyroid cartilage, *sub-hyoid*, or below the thyroid, *sub-thyroid*, and in the latter cases not only the crico-thyroid membrane but the cricoid cartilage and the trachea may be incised, *partial tracheo-laryngotomy*. From an analysis of 23 operations reported by von Bruns, and of several cases collected by himself, Baratoux forms an unfavorable opinion of the operation. It appears to have given good results in the hands of two or three operators only. It is just as much as he would do to recommend it in cases of well circumscribed sarcoma, and in cancers of limited extent, which do not involve the surrounding tissues.

Extirpation of the Larynx. The author gives a table of 167 cases of extirpation of the larynx for cancer, or supposed cancer. Of these, 112 were total extirpation, 30 were partial, a greater or less portion of the framework of the larynx being removed, and 25 were unilateral, exactly one half of the larynx being removed. Cases where only the epiglottis was left are counted as total extirpation. In point of date, the latest case in the list is one of Hahn's, of February, 1888.

Total Extirpation. There are 112 cases; of those 6 were done owing to an erroneous diagnosis of cancer, 5 proving, after extirpation, to be tubercular, and 1 syphilitic. This leaves 106 total extirpations for malignant disease, of which 7 were sarcoma. Of these 17 died in the first 8 days from accidents connected with the operation, a mortality of 16 per cent. Of these 17 cases, 6 were from collapse or exhaustion, 4 from traumatic hæmorrhage, 1 from pulmonary embolism. Twenty five died of pulmonary affections, pneumonia, broncho-pneumonia and pleurisy. The third to the seventh day was the most fatal period, and out of the 25, 22 died in the first two weeks, or 20 per cent. which with 16 per cent who died of the immediate effects of the operation, gives 36 per cent deaths in the first two weeks. The pulmonary complications were chiefly attributable to the introduction of septic matter into the air passages. Fourteen other deaths occurred during

the following months from various causes, such as retarded pneumonia, difficulty in feeding, accidents with the cesophageal tube, asphyxia and septicæmia. Thus, while 36 per cent died in the first two weeks, 16 per cent died in the following months, mostly within the first four months. Of the remaining cases, 28 suffered from recurrence, or 26 per cent. Death occurred in these cases most frequently between the fourth and tenth month. There now remain 22 cases (20 cancer, 2 sarcoma), which are known to have survived without recurrence for various lengths of time. If, with the author, we take as cured those which have been watched for upwards of twelve months, we find 9 cases only, of which 2 were sarcoma, or 8.5 per cent cured by total extirpation. Of the 7 cases of sarcoma 2 were cured, or 28 per cent.

Partial Extirpation. There are 32 cases, of which 2 were for sarcoma. Of these 32 cases, 7 died in the first two weeks, or 22 per cent; 3 of collapse, 4 of pneumonia. Five died in the following months, or 15 per cent, making in all a mortality of 37.5 per cent. Six had recurrence, or 18.7 per cent. Of the remaining cases, 4 are known to have passed the 12th month, giving 12 per cent cured by partial extirpation.

Unilateral Extirpation. Twenty-five cases (22 cancer, 3 sarcoma); 3 cases died in the first two weeks, 1 of collapse, 2 of pneumonia, or 12 per cent, 4 died in the following month, or 16 per cent. Six had recurrence, or 24 per cent. Of the 12 remaining cases 5 survived 12 months or 20 per cent cured.

The following table shows the relative mortality of the various operations.

DIED IN FIRST 15 DAYS.			DIED IN THE FOLLOW- ING MONTHS.	DIED OF RECUR- RENCE	CURED.
Total	Extirpation	36 per cent.	16 per cent.	26 per cent.	8.5 per cent.
Partial	Extirpation	22 "	15 "	18.7 "	12 "
Unilateral	Extirpation	12 "	16 "	24 "	20 "

Unilateral extirpation is therefore seen to give the best results.

The selection of the operation must, of course, depend on the nature and extent of the disease, but partial or unilateral extirpation not only

gives a lower mortality than total extirpation but enables the patient to dispense with the canula, and he can speak with a certain amount of voice. In some cases even the glottis is reproduced by the healthy vocal cord on one side, and cicatricial tissue on the other, whereby a very good voice is retained.

For palliative treatment of cancer of the larynx the author speaks highly of the effects of tincture of *Thuja occidentalis* internally and locally. It appears to avert the evolution of the cancer and combats effectually the odor. When tracheotomy is necessary it should be performed lower down. Crico-tracheotomy should never be performed; antiseptic precautions should be used in the operation; the canula should not have a perforation in the convex part, so that vegetations may not enter and obstruct the passage; the canula should be long so as to reach well below the growth. In 123 cases of tracheotomy collected by the author, 4 died immediately or 3.2 per cent, 20 died in the first 2 weeks or 16 per cent, 82 in the first year or 60 per cent, 17 lived from one to five years or 12.7 per cent. The results of total extirpation give an average inferior to tracheotomy, but survival after extirpation may reach a longer limit and the patient loses, for a time at least, the painful symptoms. Moreover the result of extirpation are becoming more satisfactory every day. A comparison of the cases of unilateral extirpation with those of tracheotomy is far from favorable to the latter. In fact 20 per cent were cured by the former operation, while only 12.7 per cent survived upwards of one year after tracheotomy.

JAMES B. BALL.

ELECTROLYSIS IN PROSTATIC ENLARGEMENT.¹

In connection with the reduction of tumors by electrical currents, the studies of Dr. Leopold Casper are of interest. He aims at the reduction by electrolysis of the size of the prostate and hopes for a corresponding diminution in the evils which follow enlargement of that

¹Radical Treatment of Hypertrophy of the Prostate and of Prostatic Tumours by Electrolysis. By Dr. LEOPOLD CASPER, *Berliner Klinische Wochenschrift*, vol. xxv, June 4 and 11, 1888.

gland. In order to rid himself of the fear of embolism or abscess resulting, he experimented on the testicle of a healthy dog. The negative pole, in the shape of a needle properly isolated, was pushed into the right testicle, while the positive pole was placed on the hind foot. A current of the strength of twenty-five milliamperes or less was used, and each sitting lasted ten to fifteen minutes. A week was allowed to elapse between the sittings. After each application the scrotum swelled and then gradually contracted again. The points of puncture were invisible in a few days. At the end of the fourth sitting the testicle was distinctly smaller, and after the tenth it was no bigger than an almond, while the left was the size of a walnut. No embolism or abscess resulted.

Dr. Casper adopted the following method for electrolysing the human prostate. The needle chosen was made of platinum and iridium, isolated with varnish ("*Firniss*"). The patient lies on the left side if the right lobe is to be treated. One hundred grammes of a solution of corrosive sublimate (1 in 1000) are injected into the bowel, and the plate connected with the positive pole is moistened and laid on the abdomen. The forefinger of one hand is passed into the rectum and guides the needle introduced by the other hand, so that it pierces the prostate at the chosen spot. A current of the strength of from 10 to 25 milliamperes is continued for 5 minutes, after which the needle can be *partially* withdrawn and pushed inward again, so as to pierce a fresh part of the same lobe. This is repeated at the end of another 5 minutes, so that each sitting lasts 15 minutes. The puncture is almost painless, and only a slight burning and pricking is felt in the glans penis after the strength of the current exceeds 12 milliamperes. The sittings may be repeated twenty times at convenient intervals. Catheterization and the other measures usual in such cases may be continued.

Only four cases. First case: æt. 61. Difficulty in passing water for the last five years. Micturates every hour by day, and four or five times during the night. The urine comes by drops. Has used the catheter once daily for three years. Burning feeling constant in the rectum. Prostate enlarged, especially on the left side; 150

cc. of urine drawn off after the patient had emptied the bladder. Prostate was electrolysed twelve times in about six weeks. Between the second and third sittings the bladder could only be relieved by the catheter; urine bloody. No rise in temperature. After the fifth sitting urine was passed every hour and a half. Residuum in the bladder 70 cc. After the sixth sitting urine was passed without pain every three hours. After the twelfth sitting the prostate was markedly decreased. Residuum in the bladder only 20 cc. Water was passed once or twice in the night, and every three hours during the day. Health good.

Second case. Patient *æt.* 62. Complete retention after long continued difficulty in micturating. The catheter was used and the bladder washed out. Five applications of electricity, after which condition became serious, urine stinking, tongue coated, thirst. After the seventh sitting a recto-vesical fistula formed and patient passed urine by anus and urethra. From that moment condition rapidly improved. Was dismissed in good health, but with fistula remaining.

Third case. Complete retention. Prostate very large. For three months urine has been passed involuntarily at night, and during the day in small quantities at very short intervals. Little improvement after fifteen sittings.

Fourth case. For two years difficult micturition. Prostate much enlarged; residuum 300 cc. Ten sittings, after which condition much improved. Passed water every three or four hours by day, and once in the night. Residuum 50 cc.

Of these four cases, the third showed little improvement, the bladder having been too long in an atonic condition. The treatment of the second resulted in a fistula. This accident occurred from the needle having passed through the prostate and punctured the bladder, while, unfortunately, the isolating material had been damaged at the same sitting. The patient probably owed his life to the mishap, as his condition, which had been dangerous, improved from the moment the fistula was established. The condition in the first and the fourth case was much improved, both as regards objective and subjective symptoms. The prostate in each case markedly diminished in size, and, what was very important, the residuum of urine fell from 150 and 300

cc. to 20 and 50 cc. respectively. Pain in micturating and the frequency of the act both diminished in each case, and the health improved in a corresponding degree.

Dr. Casper mentions four groups of cases in which no good result is to be expected from electrolysis. (1) Cases in which the prostate is increased not so much in thickness as in length or breadth, so as to have "infiltrated the wall of the bladder." In such cases the wall in the neighborhood of the prostate becomes too stiff ever to regain elasticity. (2) Cases of too prolonged dilatation of the bladder. (3) Cases of concentric hypertrophy of the bladder. In these three the wall has permanently lost its elasticity. (4) Cases in which the hypertrophy of the prostate is not great, but takes a direction toward the neck of the bladder, so as to act, perhaps, like a valve—so-called middle lobe hypertrophy. Such might be benefitted by a special instrument introduced through the urethra.

JOHN SHAW MACLAREN.

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. The Disinfection and Hardening of Rubber Drains.
By DR. JAVARS. Rubber drains, prepared in antiseptic solutions or disinfected by boiling, are thereby rendered so soft as to be easily rendered useless for the time being by slight pressure upon them by surrounding tissues. He suggests hardening them as follows: The orange red variety is best adapted to the process. The tubes are placed for about 5 minutes in concentrated sulphuric acid, the large sizes requiring a rather longer immersion. They are then washed in 75% alcohol and placed in a 5% solution of carbolic acid, or a 1-2000 solution of mercuric bichloride. Tubes thus prepared will withstand a considerable amount of pressure. If they become harder than desirable, rolling them for a few moments between the thumb and fingers will soften them. Tubes thus prepared have maintained their lumen intact even when placed in the intercostal spaces for empyema.—*Centralblatt f. Chirurgie*, 1888, No. 33.

II. The Antiseptic Protection of Iodoform Collodion.
By HANS SCHMID. The wound is first firmly sutured after proper disinfection by buried sutures of catgut, the integumentary margins being drawn together by silk sutures, and covered with iodoform collodion. Deep suturing in some instances may be omitted. Drainage is never employed and the question is raised as to whether the methods of drainage commonly employed are not frequently inefficient, and occasionally harmful. Buried sutures replace compression. Those not adepts in antiseptic technique will do better not to suture the wound at all, but tampon with iodoform gauze and rely upon secondary suture, or union by second intention. The cases in which drainage can be omitted,

and the iodoform collodion applied will suggest themselves at once. The method is particularly applicable to wounds of the face and scalp, plastic operations, wounds of the fingers, operations upon the penis, phymosis, etc. The crust is not disturbed for from 10 to 14 days. Fingers should not be encircled with the iodoform collodion for fear of endangering their nutrition.—*Centralblatt f. Chirurgie*, No. 19, 1888.

III. Further Researches upon the Origin of Suppuration; its Relations to Ptomaines and to Blood Coagulation. By PROF. SCHEUERLEN. The author made a putrid infusion of rabbit's flesh by treating the same in water at a temperature of 25° C. It was then freed from albumen by heat, filtered and evaporated to 10 ccm. This injected under the skin of rabbits gave rise to but slight symptoms, but increased temperature. The same fluid, sterilized in small closed glass tubes, and broken in situ at the end of 3 weeks, excited at first no noticeable reaction externally; but after a further sojourn of 3 or 4 weeks in the tissues, the tube was found to be surrounded by a firm connective tissue capsule and isolated from the remaining opaque infusion in the middle of the tube with a yellowish white, pulpy substance of 3 or 4 mm. thickness. This substance proved, upon microscopical examination, to be pus, but contained no micro-organisms. This suppuration differed from that produced by an organized agent in that in no single experiment did it have a progressive tendency to penetrate further into the tissues.

A second experiment with 3 parts of the putrid meat infusion and 1 pint of blood resulted in prevention of coagulation of the blood.

In a third series of experiments, Scheuerlen prepared 30 pure cultures of *staphylococcus pyogenes aureus* and *albus*, upon agar-agar gelatine with an extract of meat obtained by percolation with hot water, and evaporating from 150 ccm. to 8 ccm. in a water bath. This, after sterilization, was introduced under a rabbit's skin in the same manner as in the above experiments, and resulted in precisely the same manner both as regards the suppuration and the prevention of coagulation.

It is shown by these experiments that a pure culture of *staphylococcus pyogenes aureus* as well as *albus* produces a decomposition product, which arrests coagulation of blood and causes suppuration.

A similar relation to the production of suppuration and the prevention of coagulation of blood is shown by two other ptomaines, namely, cadaverin and putrescin, placed at the disposal of the author by Brieger.—*Archiv. f. klinisch. Chirurgie*, bd. xxxvi, pp. 925-933.

IV. The Probing of Granulating Wounds. By R. von MOSETIG MOORHOF. The author utters a timely warning against the too frequent abuse of the probe in granulating wounds. Septic infection can be produced not only through unclean instruments, but by means of the most carefully disinfected probe. The granulating surfaces exposed to the air, probably have upon their surface harboring places for bacteria. So long as the granulations remain intact, these germs are innocuous; as soon as the granulations are injured, the lymphatic spaces are opened, into which the cocci pass. They quickly multiply and initiate progressive septic processes. These dangers are diminished by careful disinfection of the wound as well as of the probe before introducing the latter. Cauterization of the surface with nitrate of silver previously, or simultaneously with the use of the probe by coating the latter with the melted salt, is recommended as an efficient method of preventing infection.—*Wiener Med. Presse*, 1888, No. 15.

G. R. FOWLER (Brooklyn.)

V. A New Mode of Treating Tuberculous Processes. By A. LANDERER (Leipsic). An experimental study of tuberculous affections, with a view to their cure, extending over a period of five years, and still unfinished for want of time.—Tuberculous affections of the more severe forms, such as suppurative, cheesy, necrobiotic processes can heal by cicatrization. Now tuberculous inflammations, having only a limited blood-supply (due to the slight vascularity of the formations), are not prone to cicatrise. Hence it becomes necessary to establish an inflammation at the points affected, in order to produce a solid cicatrix and thus cure the disease. The author seeks to establish an aseptic inflammation by chemical means. Carbolic acid and sublimate are not eligible for this purpose on account of their being too quickly absorbed; others, such as creoline, have not yet been tried.

After numerous experiments the author came to prefer Peruvian balsam, to which he attributes an excellent anti-tubercular action. This substance requires to be brought into contact with every portion of the tuberculous diseased tissues, and in a sufficiently concentrated form. For tuberculous ulcerations of the skin, he uses a plaster prepared with one part balsam to three or five parts of adhesive plaster, to which one part of wax may be added. For fistulae and deeper seated ulcerations, he uses a solution of the balsam in sulphuric ether (one in three, or one in five) for injection. For injection into the tissues he uses an emulsion of the concentration of one in 400 or 500 and alkaline in reaction, being a suspension of an emulsion prepared with oil of almonds in a 0.7 per cent solution of salt. In order to combat the disease in the entire system, and reach such foci as are situated at points removed from the surface (as in the lungs), he makes intravenous injections of this emulsion, taking care always to observe the size of the globules with the microscope beforehand in each case so as to ensure their not being larger than a red blood-corpuscle. If this is the case he expects the particles to be deposited by the blood-current at the foci of disease, as has been experimentally shown of other bodies by Schuller and others.

After perfecting the technique (which is accurately described) by injections in healthy rabbits, the author next inoculated a number of other rabbits with tuberculous material, and then treated them according to his methods, with more or less efficiency, according to the intensity of the infection and the care taken to cure it. Microscopic examination appears to verify the author's expectations as to the formation of connective tissue around the foci.

The observations made of this method of treatment in human subjects amount to 51 in number. 16 cases of tuberculous lymphatic glands of several years standing, and repeatedly but unsuccessfully treated by operative methods, were permanently healed within 4 to 12 weeks. 29 cases of bone disease, generally implicating joints (white swelling), some of which had refused amputation, were cured and their general health wonderfully improved after treatment by injections, combined in some cases with minor operative procedures.

Four cases of lung-tuberculosis were also treated by intra-venous injections. Two recovered after cure of bone disease; two others improved for a time; one could not be treated sufficiently long. One case of tuberculosis of the bladder was much improved after a mixed treatment.—*Münchener Medicin. Wochenschrift*, 1888, No. 40 and 41.

W. W. VAN ARSDALE (New York).

VI. Experimental Contributions upon the Etiology of Traumatic Tetanus. By Dr. v. EISELBERG. The question of the occurrence of typical tetanus after injury in individuals heretofore healthy, is carefully considered. The opinion is held that infection by means of field and cellar earth, wood splinters, etc., is the direct cause of the disease. This is further strengthened by experiments upon animals in whom the disease was produced by inoculation from these materials, and, moreover, the existence of the specific bacillus could be demonstrated at the point of inoculation. Wound secretions and portions of skin from the wound edges of those persons affected with the disease, were found to be frequently tetanogenetic to animals; a like result was produced by inoculation of mixed cultures. Attempts to make purer cultivations from these materials failed. The existence of idiopathic or spontaneous tetanus is doubted, the author believing that the point of entrance of the specific poison into the body may be so small as to escape notice. This view has been held by Verneuil for some time. The etiological conditions of tetanus are, therefore, in this respect, analogous to those of erysipelas.—*Wiener klinische Wochenschrift*, 1888, Nos. 10 and 13.

GEO. R. FOWLER (Brooklyn).

VII. A Case of Akromegalia. By Dr. A. BIER (Kiel). Of interest in view of the American case recently shown by Dr. Adler, of New York. Bier numbers his as the third case so far described since Maril's, in 1886. One of these, as yet unpublished, was shown by Curschmann before the Schleswig-Holstein Medical Union. The general characteristics of the disease are:

1. It begins in middle life and runs a very slow course.
2. The most prominent symptom is a remarkable enlargement of

peripheral portions of the body, especially the hands, feet and face.

3. Curvature of the spine, particularly the cervical, long oval form of the face, disorders of the sensory organs (weak vision to complete blindness, poor hearing).

4. Severe neuralgias.

5. Muscular weakness and some cachexia.

6. Polydipsia and polyuria.

7. Tendency to the formation of varices and hæmorrhoids.

The enlargement of distal parts is the essential feature, as the other symptoms may in part be absent.

B.'s patient was a man of 31 years. A full description with two full-page illustrations is given. General sensation and vision only were disturbed; speech unaffected; intelligence good; no hæmorrhoids; no polydipsia nor polyuria; old rhachitis; atrophy of thyroid gland. His trouble seems to have begun in his 20th year (1876) with neuralgia of the head, though the first swelling (left thumb) appeared in 1879, since which time gradually other parts have become involved.—*Mittheil. a. d. chirg. Klinik zu Kiel*, IV, 1888.

WILLIAM BROWNING (Brooklyn).

CUTANEOUS AND MUSCULAR.

I. On the Treatment of Abnormal Formations of the Epidermis. By DR. ROSEN (Munich). The author has successfully adopted in von Nussbaum's clinic, the following in the treatment of corns, warts and callosities: The part to be removed is first somewhat moistened with an antiseptic solution, and then covered with a thick layer of pure crystals of salicylic acid, covered with a four-fold layer of moist boric lint, and this in turn is covered with rubber tissue. In from 5 to 10 days the dressings are removed, when the abnormal tissue constituting the corn or callosity is found to be shrunken, and lifted from its base, while the healthy skin beneath remains quite free from the action of the acid.—*Munchen. med. Wochenschrift*, 1888, No. 9.

G. R. FOWLER (Brooklyn)

II. Skin Grafting According to Thiersch's Method By DR. FELIX FRANKE (Brunswick). The author's first two cases were, first, a bedsore over the tendo-achilles, and, second, an ulcer on the inner side of the thigh and outer side of knee, due to a burn. He used skin from an amputated leg to cover the defects, but had only a partial success. He attributes his failure first to want of practice, second, that the skin came from a tuberculous individual. After this he always used skin from the patient himself and found that the best place from which to remove the skin was on the outer side of the thigh near the great trochanter. The strips removed were often 10 to 12 cm. long and 4 to 5 cm. wide. He found these large strips healed thoroughly provided that all hæmorrhage from the previously scraped ulcer had been completely checked. The grafts were covered with rubber tissue, over which an antiseptic dressing was applied, and this was changed on the 4th day.

The author finds that transplantation of frogs skin gives no permanent result; it heals on temporarily, but later becomes either loosened or completely absorbed.

He treated all cases of ulcer of the leg, in his hospital wards, by skin grafting according to Thiersch's method and is so satisfied with the results that he states that ulcers should not be treated by any other method.

He details some of his more interesting cases. One, a man æt. 20 years, had been suffering for two years from an ulcer on the left leg, which ulcer was situated a little below the middle of the tibia and measured 10 cm. in its transverse diameter; its appearance was unclean, and its centre full of exuberant granulations; the edges were hard, glazed and firmly attached to the bone. The tibia in this neighborhood was much thickened as by the formation of callus, the skin in the neighborhood was bluish brown and felt cicatricial, and was not as freely movable as on the other leg. Frog grafting was tried without result. A plastic according to Maas was undertaken, and to do this properly, a piece of bone about the size of a silver dollar had to be chiseled out of the centre of the ulcer; the flap was taken from the posterior surface of the right leg. The flap healed kindly but was so

much thicker than the surrounding parts that a piece was excised. The loss of tissue on the right leg was covered with grafts taken from the upper and outer side of the thigh.

When the patient was seen a year later the result was perfect and there was no return of the ulcer.

He also reports a case of ulcer over the tibia due to a compound fracture, and treated in the same way by his colleague Dr. Voelker; here also the result was perfect. Another case was an extensive burn of the body treated by skin grafting according to Thiersch's method and with good result; previous to this he had tried grafting skin taken from two healthy individuals, but without result, and he ascribes the failure to the patient being much younger than the persons who gave the skin.

The author credits Thiersch with the observation that negroes' skin healed kindly on a white man, but that white skin would not heal well on a negro.

He speaks of the danger of transplanting skin from one individual on to another, and says that syphilis and tuberculosis have been so transmitted, and cites a case mentioned in the *Deutsche Militärärztl. Zeitsch.*, 1872, Part 1, where small-pox has been so transmitted.—*Deutsche med. Woch.*, No. 3, 1887.

F. C. HUSSON (New York).

III. Upon Muscular Hernia. By DR. GUINARD. In an experimental study, G. makes the observations that tumors produced by true muscular hernias lessen in size during contraction of the muscle, and quite disappear; that upon *passive* motion, in which the points of attachment are made to approximate each other, the tumor makes its appearance, but when the same parts are acted upon in an *active* manner (true muscular contraction), the tumor again disappears, as also happens when extension is made. There are cases of apparent muscular hernia which occur in uninjured but thinned sheaths of muscles, and which offer appearances of true muscular hernia. In the popliteal space, muscular hernias occur which closely simulate cystic tumors, as shown by an observation made in Verneuil's clinic.—*Gaz. Hebdom. de Med. et de Chir.*, 1888, No. 14.

G. R. FOWLER (Brooklyn).

IV. Pseudo-Hypertrophy of Muscles after Long-Continued Œdema of the Limb from Thrombosis of Veins. By JONATHAN HUTCHINSON (London). The author refers to three cases where after phlebitic plugging of one or more veins of the lower extremity, there has followed pseudo-hypertrophy of the muscles of the corresponding limb without any other change, no loss of natural contour, no œdema, but simply overgrowth restricted to the muscles. When there is any paresis, it is in the overgrown limb that it is first noticed. In two of the cases there was a difference of $\frac{3}{4}$ in. and $\frac{1}{2}$ in. respectively in the size of the two calves, the enlargement being on the side where the phlebitis had been present. The third case was complicated by some signs of lymphatic obstruction as well as the muscular hypertrophy.—*Illustr. Med. News*, Dec. 1888.

J. ANDERSON SMITH (LONDON).

NERVOUS AND VASCULAR SYSTEMS.

I. Clinical Contributions to Nerve Surgery. By Prof. ALBRECHT (Zurich). The results of physiological studies, as well as clinical observations are considered in discussing the question of restoration of function of divided nerves following suture and primary union. The conclusion is reached that this restoration is impossible, and bases this conclusion upon the following: The rapid degeneration toward the periphery of the nerve elements is an insuperable barrier to primary union of a divided nerve fibre which shall include conducting power. Restoration to functional activity depends upon a regeneration of the nerve elements from the fibres of the central end, which finally reach along the track of the old nerve, to find their termination in skin or muscle. This manner of restitution occurs also when strict union of the nerve elements cannot be said to have occurred.

Union by suture and immediate restoration of function by this means is a fallacy. In cases where this is believed to have taken place, anastomosing nerves have taken upon themselves the function of the injured nerve. Atrophy of muscular structures and diminished electric excitability occur even after suturing. It is admitted that, in exceptional cases, restoration to function may occur in from 3 to 4 weeks,

but in the great majority of instances fully 10 to 12 weeks are necessary.—*Deutsche Zeitschrift f. Chirurgie*, Bd., 26, p. 430.

GEO. R. FOWLER (Brooklyn).

II On the Therapeutic Value of Nerve-Stretching. By Dr. M. A. VASILIEFF (Warsaw, Poland). The author details three cases of nerve-stretching for supposed peripheral neuritis. Case I refers to a man of 24, with frequent epileptoid fits of 3 years' standing, which had commenced to occur about a month after his having received a traumatic injury of the left great sciatic nerve, in consequence of a fall from a considerable height. The fits commenced invariably with an intense pain and convulsions about the left lower limb, which then spread to the right one, and were followed by epigastric pain, loss of consciousness and general convulsions. The fits could be induced by pressure on the nerve which was distinctly tender. Electricity and therapeutic treatment having utterly failed, Dr. Vasilieff opened the sheath of the nerve and stretched the latter with two fingers both in a centripetal and a centrifugal direction. Not a single fit occurred after the operation up to the date, 1½ years later. Pressure on the nerve does not produce any pain at present. Case II is of a lad of 19, with rheumatic paralysis of the left facial nerve, of 4 months' duration. The inferior branch of the nerve was stretched by means of a hook, after Hueter's method (an incision, 4 cent. in length, along the posterior edge of the ramus of the lower jaw). Two days later, the patient's mouth, which had been previously strongly depressed toward the left side, was found to be straight, and faradic nerve-irritability (previously absent on the paralysed side) normal on both sides. On examination several months later, however, his state proved somewhat worse, since on laughing, there was observed a slight depression of the left angle of the mouth. Case III concerns a workingman of 38 with a traumatic paralysis of the left facial nerve. Not the slightest improvement could be obtained from the operation, the nerve being found intensely degenerated and atrophied; one of the branches was even torn across during the procedure. To elucidate the influence of stretching on the nerve and spinal cord, the author carried out five experiments on rabbits in Prof. Navrotsky's laboratory. In all, the great sciatic nerve

was stretched, and that with a force not surpassing one-twentieth of the animal's weight. The conclusions arrived at are these: 1. In about 5 or 7 days after the operation, there are invariably found *a*, a decrease in electrical excitability of motor nerves on the side operated upon, and *b*, an increase in the irritability in the corresponding region on the opposite side. 2. In about 1 or 2 months, the excitability on the operated side gradually increases to reach either a normal level or (in 3 of 5 cases) a still higher one (comparatively with the state before the operation). 3. Simultaneously, the excitability on the opposite side gradually decreases, but still never reaches its previous (before the operation) level. 4. Microscopical examination of the spinal cord, made about 2 months after nerve-stretching, gives invariably entirely negative results. 5. Hence, nerve stretching, when performed with a but moderate force, gives rise only to certain "functional" changes in nerves and the cord, but not to any stable organic ones (*vide infra*). 6. On the whole, nerve stretching may be regarded as a palliative means best suited for relieving some affection of peripheral nerves. Sometimes, however, even a seemingly complete cure may be obtained (see case I). At all events, notwithstanding Koenig's declarations, the operation is fully justified. In the *Vestnik Psikhiiatrii*, vol. I, 1884, p. 98, Dr. Paraskovia Tarnovskaia, of Professor I. P. Merzeievski's clinic, has published her experiments on stretching the great sciatic nerve in 40 rabbits, which show that the traction equal to 1 or 1½ pound induces a slight temporary congestion of the spinal cord, while that amounting to from 5 to 12 pounds (that is, to a single or double weight of the animal's body) invariably gives rise to most serious traumatic lesions of the cord, such as hæmorrhage, consecutive diffuse sclerosis (especially of the posterior column), with atrophy of nerve fibres and cells, rupture of nerves, etc. Hence, the lady believes that, as far as tabes is concerned, "nerve-stretching is apt only to cause a more or less grave injury to the patient, but is utterly powerless to bring about any stable amelioration." Dr. Vasilieff justly observes that Tarnovskaia's statements have no practical value, since nobody will ever venture to perform in human beings a traction amounting to a double or even a single weight of the patient's body ;

meanwhile only such violent tractions might be followed by traumatic disasters analogous to those as found by Dr. Tarnovskaia in her rabbits.—*Khirurgichesky Vestnik*, Sept. and Oct., 1888.

III. On Ligature of the Subclavian Artery. By Professor PAVEL I. MOROZOFF and Dr. N. N. MIKHAILOFF (Kiev, Russia).—At the third General Meeting of Russian Medical Men at St. Petersburg, Professor Morozoff read an elaborate monograph on the subject, based on 434 cases which he and Dr. Mikhailoff have been able to collect from international literature. Below is a condensed summary of the important work.

A. *Cases.* They are divided into four natural groups. I. *Ligature of the first part of the subclavian* (behind the scaleni). The group includes 22 cases, in 15 of which the artery was tied alone, in 5 simultaneously with the right common carotid, and in 2 the operation remained incomplete. All ended in death, the cause being as a rule consecutive hæmorrhages. II. *Ligature of the second part of the subclavian* (between the scaleni). 16 cases, of which 7 recovered, 8 (53.3 per cent) died, in one the ultimate issue remained unknown. Since in 6 out of 8 fatal cases, death was caused by various complications which had nothing to do with the operation itself (such as preceding abundant hæmorrhages, pyæmia, nosocomial gangrene, etc.), they must be excluded from consideration. There remain, therefore, 9 cases with 7 recoveries and 2 deaths (22.2 per cent.). III. *Ligature of the third part of the artery* (outside of the scaleni, above the clavicle). The group embraces 338 cases, in 285 of which the subclavian was tied alone, and in 53 simultaneously with the common carotid. a. *Ligature of the subclavian alone.* Of 285 cases, in 12 the operation was incomplete; in 4, a vein or a nerve instead of the artery was tied by mistake; in 7, there was some gross uncertainty about details. On excluding the 23 cases, there remain 262, of which 225 belong to the pre-antiseptic period, and 37 to the antiseptic. a. Of 225 *pre-antiseptic cases*, in 103 recovery, and in 121 (54 per cent) death ensued; in one a subsequent ligature of the first division became necessary. Since in 39 out of 121 fatal cases death was determined by various accidental causes, they

are to be excluded. There remain then 185 cases with 103 recoveries and 82 (44.3 per cent) deaths. b. Of 37 *antiseptic* cases, 22 ended in recovery, and 15 (40.5 per cent) in death. In 8 out of the 15 death was caused by accidental complications. Hence, on excluding the 8 cases, we have 29 with 22 recoveries and 7 (24.1 per cent) deaths. c. *Simultaneous ligature of the subclavian and common carotid: vide infra sub B. II.* IV. *Ligature of the fourth part of the subclavian* (below the clavicle). 58 cases, in 56 of which the subclavian alone was tied, and in 2 the subclavian and common carotid simultaneously. a. *Ligature of the subclavian alone.* In 7 out of 56 cases the operation was not completed. Of the remaining 49, 45 belong to the pre-antiseptic period, and only 4 to the antiseptic. a. Of 45 *pre-antiseptic cases*, in 15 recovery followed; in 2, a subsequent ligature of the third division of the vessel became necessary; in 28 (65.1 per cent) death ensued. Since in 16 cases fatal issue depended upon accidental causes or complications, the actual mortality was 44.4 per cent (12 cases out of 27). b. of 4 *antiseptic cases*, only one recovered, while 3 died (2 of them from accidental causes). c. *Simultaneous ligature of the subclavian and common carotid: vide infra sub. B. II.*

B. *Mortality.* I. *Ligature of the subclavian alone.* Having excluded (without giving any motives) the first group with its 100 per cent of deaths, the authors deal only with the remaining three categories which supply 252 cases fit for their analysis. Of the 252, in 148 recovery, and in 104 death, took place, the mortality being, therefore, 41.2 per cent. Of 252, 221 belong to the pre-antiseptic period; of them only 125 recovered, while 96 (43.4 per cent) died. The other 31 cases occurred during the antiseptic period; 23 of them recovered; 8 (25.8 per cent) died. II. *Simultaneous ligature of the subclavian and common carotid.* 55 cases, of which 53 refer to ligature of the third division and only 2 to that of the fourth. a. *Ligature of the third division.* Of 53 cases, in 41 the subclavian and common carotid were tied at one sitting; in 12 at two. a. *Ligature at one sitting.* Of 41 cases, in 40 the right vessels, and in 1 the left, were tied. Four cases belong to the *preantiseptic* period: of them 1 recovered, 1 improved and 2 (50 per cent) died. The remaining 37 *anti-*

septs, cases gave 18 recoveries, 8 improvements and 11 (29.7 per cent) deaths. Since in 3 out of the 11 fatal issue was caused by accidental complications, the actual mortality amounts only to 23.5 per cent. *b. Ligature at two sittings.* Of 12 cases, 5 belong to the *pre-antiseptic* period, every one of them ending in death (100 per cent); of 7 antiseptic cases, the operation was followed in 2 by recovery, in 3 by improvement, and in 2 (28.5 per cent) by death. *c. Ligature of the fourth division.* In both of the cases belonging to the antiseptic period the vessels were tied at one sitting; one ending in recovery, another in death.

C. Indications. II. Ligature of the subclavian alone. 1. *Aneurisms.* The *second* division was tied invariably for axillary aneurism, the mortality being 22.2 per cent (2 to 9 cases). The *third* division in the pre-antiseptic period was ligatured for aneurism in 100 out of 185 cases, the results being in 59 complete recovery, in 2 recovery with atrophy of the limb, and in 39 death (39 per cent). Of 29 antiseptic cases, the division was tied for aneurism in 17, with 12 recoveries and 5 (29.4 per cent) deaths. The *fourth* division was tied for the disease in 11 out of 27 pre-antiseptic cases, and in 1 of 2 antiseptic ones, all the patients recovering. Therefore, the subclavian was tied for aneurisms, on the whole, in 138 cases, with 92 recoveries and 46 (33.3 per cent) deaths. 2. *Hæmorrhage from wounds* constituted an indication for tying the *third* division in 46 pre-antiseptic cases, with 22 recoveries and 24 (52.2 per cent) deaths; and in 6 antiseptic cases, of which all recovered (in one, however, with loss of the extremity). The *fourth* division was tied for bleeding in 11 pre-antiseptic cases, with only 3 recoveries and 8 (72.7 per cent) deaths. On the whole, the ligature for bleeding presented mortality equal to 50.8 per cent (32 to 63). 3. *Hæmorrhage from ruptured aneurism, or after operations* (amputations, ligatures, etc.), was treated by tying the third or fourth divisions in 36 cases, with 17 recoveries and 19 (52.7 per cent) deaths. II. *Simultaneous ligature of the subclavian and common carotid* was invariably resorted to on account of *aneurisms*. The *third* division was tied at one sitting with the carotid for *innominate aneurism* in 20 cases with 13 recoveries, 2 improvements and 5 (25 per cent) deaths; for

innominate and subclavian one, in 1 case ending in recovery; for *aneurism of the aortic arch* in 6 cases, with 3 recoveries, 1 improvement and 2 (33.3 per cent) deaths; for *aneurism of the aortic arch and innominate artery* in 7 cases, with 2 recoveries, 3 improvements and 2 (28.6 per cent) deaths. On the whole, out of 34 cases only 9 (26.5 per cent) died. On addition of such cases where the third division and carotid were tied at two sittings, as well as those of ligature of the fourth division and carotid, we obtain 46 cases, with 30 recoveries and 16 (34.7 per cent) deaths.

D. *General corollaries.* 1. In pre-antiseptic times, ligature of the third and fourth divisions gave an approximately identical percentage of deaths (about 44 per cent). 2. Ligature of the second portion of the vessel in that period was seemingly followed by a lesser mortality (22.2 per cent). However, the total number of the cases is too small for justifying any positive conclusions. 3. In our antiseptic days, ligature of the third division gives a comparatively low mortality, amounting to from 25 to 30 per cent. 4. A simultaneous (at one sitting) ligature of the third division and common carotid, resorted to for aneurism of the innominate artery and aortic arch, gives nowadays excellent results, the mortality amounting only to 26.5 per cent. Hence the operation represents one of the most valuable acquisitions of modern surgery. 5. Generally, ligature of the subclavian as a curative means for aneurisms gives a relatively low percentage of deaths (about 33). 6. The worst results are obtained from the ligature in cases of hæmorrhage (of any kind), the mortality surpassing 50 per cent.—*Transactions of the Third General Meeting of Russian Medical Men at St. Petersburg, 1889, No. 10.*

VALERIUS IDELSON (Berne.)

IV. Wounds of the Internal Mammary Artery. By WILHELM KOCH. Wounds of this region are not often seen in civil practice, but occur in military surgery as a result of sabre cuts, and cuts made in sabre position of "seconde" and "quatre."

A well directed "seconde" cut falls on the right side of the face, neck and shoulder, while a "quatre" cut falls on root of neck on left

side and on anterior and left side of chest. It is not uncommon for a "seconde" cut to strike on the outer third of the clavicle, and to penetrate in the deltoideo-pectoral groove, severing all the great vessels in this region.

In a "quatre" cut the direction of the wound is from inner portion of the left clavicle diagonally downward, severing the insertion of the 3d and 4th costal cartilages, opening the left pleura, severing the internal mammary artery and its accompanying veins, and sometimes wounding the lung.

The author has collected a large number of observations on wounds of the internal mammary artery. Wounds of the artery in the vicinity of the sternal end of the clavicle are not discussed here, since they are usually attended with injury to the larger vascular trunks (subclavian artery and vein, carotid and innominate arteries), and are therefore of secondary importance.

The sternal portion of the internal mammary artery extends from the first costal cartilage to the sixth intercostal space, where the vessel divides into two branches, and is accompanied by two veins. Of some practical importance is the distance of the artery from the margin of the sternum, which the author finds to vary from 3 to 22 mm.

The anatomical relations of this portion of the artery show that wounds of this vessel without simultaneous injury to the pleura, lungs or heart, are only exceptionally possible. Owing to the intimate relation of the vessel to these structures, bleeding from the vessel is of less importance than the coexisting severe laceration of the neighboring parts.

Only four cases are found in literature in which wound of the pleura was absent. The pleural wounds are often so extensive as to lay open the anterior mediastinum.

In 35 cases of wounds of the internal mammary artery, the pericardium alone was opened in 3, and the heart wounded in 7 (four being perforating and three non perforating wounds). The divided and bleeding ends of the artery were directly visible, without further exposure in two cases, but usually the divided vessel retracts behind the costal cartilages, or into the intercostal spaces.

Bleeding from the external wound is inconsiderable, unless the patient stirs or coughs when dark blood mixed with air pours from the thoracic cavity. Gradually the signs of hæmato-thorax develop, except in the rare cases where the pleura is not wounded. If the blood escapes externally in a large pulsating stream from the 3d, 4th or 5th intercostal space near the sternum, if the thoracic cavity is rapidly filled, and marked syncope and acute anæmia supervene, it is certain that the heart is the main source of the hæmorrhage. Hæmorrhage from the 3d, 4th or 5th intercostal space, if due to wound of the internal mammary artery is usually internal; the blood escaping into the pleural sac and pericardium.

The first symptoms of wounds of the internal mammary and adjacent parts are external and internal hæmorrhage, hæmopneumothorax, (more rarely hæmopericardium), and impairment of respiration and cardiac action.

Of the 38 cases reported, only 3 succumbed from acute hæmorrhage. In other cases, when the patient lived for a number of hours, dyspnœa, commencing sepsis and acute pulmonary œdema contributed to the fatal issue. Cases are recorded in which patient lived for some time, and the bleeding from the mammary was spontaneously arrested.

Surgical means were usually of little value in causing an arrest of the hæmorrhage; tamponing was successful in one case, and heroic venesection in two others.

Of the 38 cases, 9 died within 24 hours, 1 in 48 hours of hæmorrhage and sepsis. Of the remaining, one died of peritonitis, one of mediastinitis, three of mediastinitis and pericarditis, thirteen of pleuritis, and nine recovered.

The pleurisy was treated by operative means in only three cases and then after incorrect principles. None of the patients living for some time escaped secondary hæmorrhage, and this usually contributed to the fatal termination.

The deductions drawn by the author from an analysis of the 38 reported cases, are, that in only four or at the most five cases, were the complications of an absolutely fatal character, with the present means at our disposal. An attempt should have been made in at least 33

cases to ligate the artery and treat the hæmatothorax, the pleuritis, hæmopericardium, mediastinitis and fracture of the sternum. It is to this neglect that the high mortality is due.

Of course surgical interference is futile in cases in which the heart and large vessels are wounded. In other cases, the treatment should be based upon the rapidity with which the hæmopneumothorax is developed, and the condition of the wound. If hæmothorax occurs early, and the wound is small, it would seem hazardous to enlarge the opening and search for the bleeding vessels. This procedure would probably increase the pleural wound, and the withdrawal of the blood from the thorax would remove the compressing force on the lung, which is the best provisional means of arresting pulmonary hæmorrhage of this kind.

It is better, in these cases, to make an incision in the intercostal space above and below the wound and to secure the bleeding vessel in this situation. The hæmatothorax should not be removed until it has become stationary, and may then be punctured or withdrawn by incision of the pleuræ, after the resection of a rib. If, on the other hand, the wound is large and permits of inspection of the thoracic cavity, the artery should be at once ligated in the wound. If the hæmothorax is due to a wound of the lung, and is not checked by ligation of the mammary artery, the outer wound may be closed with an impermeable compress, so as to increase the intrathoracic pressure. If, however, the hæmothorax comes chiefly from the mammary, and the pulmonary wound is unconsiderable, resection of the rib should be at once performed and the exudate removed, the incision being made at the most dependant part.

When the wound of the mammary is so situated in the 2d or 3d intercostal space, and is complicated by a not rapidly fatal opening in the pericardium, the vessel should be ligated and the wound closed antiseptically on the outside, and the hæmopericardium be treated by surgical means.

There remains one class of cases, in which besides division of the internal mammary, the heart is wounded in a not immediately fatal manner. In these cases, if blood is seen to issue from the peri-

cardium, the opening should be closed the mammary artery ligated and the pleural wound sutured.

As regards technique of ligation of the internal mammary the following may be said. The vessel is frequently wounded behind the costal cartilage and to bring it into view, a corresponding piece of the cartilage must be excised, and the artery ligated in the adjacent intercostal space. If the wound of the vessel has occurred in one of the intercostal spaces an incision should be made down to the subpleural tissue, then in case the vessel does not appear, two flaps should be formed from the cartilage and soft parts, immediately above and below the wound, and when these flaps are turned back the artery will be visible either on the under surface of the cartilage or in the subpleural tissue, and after ligation of the vessel the cartilages are returned to their normal position.—*Archiv. f. Klinische Chirurgie*, Bd. 37, Hft. II.

F. C. HUSOX (New York).

HEAD AND NECK.

I. Experimental Contributions to Cerebral Surgery. By DR. IVAN K. SPIJARNYI (Moscow, Russia). The author has carried out 56 experiments on dogs and rabbits, in order (1) to determine the amount of vital and functional danger from brain-wounds, and (2) to study the process of healing of such wounds. The conclusions drawn by him from his researches may be condensed as follows: 1. Excision of wedges from the brain, varying in size from a pea to a walnut, is not associated with any immediate danger to the animal's life. Neither does it by itself give rise to any pronounced functional changes. The lesion, however, is frequently followed by consecutive hæmorrhage and epileptoid fits. The former complication may be prevented by carefully controlling bleeding during the operation. 2. Similarly, introduction of foreign bodies into the brain substance does not necessarily place the patient in vital danger, and does not bring about any immediate marked functional disturbances, but it is followed by secondary epileptoid symptoms. 3. Both incised and punctured wounds of the cerebral cortex and white matter are almost harmless in

regard to life and cerebral functions. 4. Strict antiseptic precautions prevent any development of traumatic meningitis. 5. Healing of cut wounds of the brain takes place through the formation of a connective tissue scar. 6. The latter is formed both by leucocytes migrating from blood-vessels, and especially by proliferating connective tissue elements of the meninges (mainly of the pia). 7. In cases of cut wounds, degenerative changes of nerve elements in the white substance and deeper cortical layers are pronounced in a by far more considerable degree than in superficial strata of the cortex. 8. In cases of incised wounds in rabbits, cariokynetic phenomena are observed both in nerve-cells and in elements of neuroglia and connective tissue. In dog, they are limited to connective tissue elements alone. 9. A strict antiseptic management of cerebral wounds gives relatively favorable results in man, too.—*Fratch*, No. 2, 1889.

II. Trephining for Traumatic Lesions of the Skull.—By DR. HERMANN TH. ZEIDLER (St. Petersburg, Russia). During the last 2½ years there were admitted to the Obukhovsky Hospital 38 cases of traumatic lesions of the skull, of which in 23 the cranial vault was injured (5 cases referred to compound fissures, 2 to subcutaneous fractures, and 16 to compound fractures). In 7 cases, primary trephining was performed, with 3 recoveries and 4 deaths; and in 3 secondary, with 2 recoveries and 1 death. The remaining 13 cases were treated without trephining; 9 of them recovered, 4 died.

In 7 out of the 9 fatal cases, death was caused by a simultaneous severe lesion of the brain, the patients dying in from a few hours to 2 days; in an eighth case by meningitis, and in the ninth by unrecognised hæmorrhage from the middle meningeal artery. Of 15 cases of lesions of the cranial base, 5 recovered, and 10 died. Analysing his cases, Dr. Seidler arrives at the following conclusions: 1. Cerebral symptoms in cases of traumatic injuries to the skull constitute an indication for a primary trephining only in the presence of an unmistakable train of symptoms pointing to an intracranial hæmorrhage from the middle meningeal artery. 2. In the absence of the hæmorrhage, no trephining is indicated in cases of subcutaneous fractures of the skull. 3.

Depression of fragments by itself cannot be regarded as an indication for the operation. 4. A possibly early primary trephining should be resorted to, either for arresting intracranial hæmorrhage, or for antiseptic purposes in cases of compound fractures (especially of comminuted, fenestrated, etc.). In the latter, the operation secures a thorough disinfection of the site of fracture, and an as thorough antiseptic management of the wound. The operation includes the removal of free fragments, elevation of depressed pieces, trimming uneven edges, etc. 5. A secondary trephining is indicated even in the presence of symptoms of incipient meningo-encephalitis. The latter may be sometimes cut short by the operation. 6. In subcutaneous fractures, secondary trephining is indicated when there are perfect symptoms of cerebral irritation (epileptoid fits) depending upon depressed fragments. 7. In cases of fractures penetrating into the frontal sinuses, antiseptic tamponade should be preferred to suturing, since the sinuses stand in communication with the nasal cavities through which atmospheric pyogenic microbes may easily enter; besides, supuration of the sinuses becomes more dangerous when the cutaneous wound is closed by sutures. 8. The safest and most reliable hæmostatic means in cases of wounds of cerebral venous sinuses is constituted by plugging the injured sinus. 9. The term "trephining" should be applied only to an artificial opening of an intact skull; the operation on a fractured skull should be named "*débridement*"—*Vratch*, No. 2, 1889.

III. A New Method of Trepanation of Mastoid Process.

By DR. L. I. MITZKUNER (St. Petersburg). Following the suggestion of Dr. A. A. Tesianoff, of Obukovsky Hospital, Dr. Mitzkuner has carried out a long series of experimental researches with the object of working out a rational method of trepanation of the mastoid bone, the essential idea being to remove the starting point of the operation to a spot higher up and nearer to the tympanic cavity, compared with that selected by Schwarzte and others. If the auricle be dragged well forward, a cutaneous fold just behind it comes to light, under which an osseous ridge can be felt. The shallow depression or furrow separat-

ing the ridge from the beginning of the base of the mastoid process is the starting point recommended by the author for trephining the bone, in preference to that of Schwartze. The advantages are said to be these: (1) A chisel or a trephine can safely penetrate into the bone as deep as 6 or 8 mm. or even more, according to the anatomical structure of the bone, which varies with the patient's age and individual peculiarities, as well as with characteristic features of aural inflammatory processes. (2) Mitzkuner's point is situated farther from the transverse sinus than Schwartze's. The situation of the sinus is said to be subject to individual variations, thus, generally speaking, the younger the subject is the larger space is occupied by the sinus in the region of the mastoid process: that is, the nearer the sinus comes to the tympanic cavity; and (3) "what constitutes the main advantage, the temporal bone of the spot indicated reaches its maximal thickness." The only drawback of the plan is that, "when a trephining instrument is used neglectfully, the posterior wall of the external osseous aural meatus may be injured, which risk, however, is, at all events, by far less grave than an injury to the transverse sinus, which accident occurs frequently [*? Ed.*] on operating after Schwartze's rules." [*Vide* ANNALS OF SURGERY, vol. vii. p. 288, April, 1888.] That his method is more rational than the ordinary ones, Dr. Mitzkuner tries to prove by the following consideration. Given a case of purulent accumulation within the tympanic cavity, the pus pent up is forced before all to find its way into the adjacent portion of the bone, which undergoes then an inflammatory softening and purulent infiltration. When the said portion becomes over filled with the pus, the latter may pass into the free cellular spaces of the mastoid process. But in some cases it does not pass into the mastoid cells, and that either because the mastoid process is sclerosed (as occurs in inveterate cases), or because the cells are developed but rudimentarily. Hence the trepanation may be sometimes indicated before the occurrence, or generally in the absence of any purulent accumulation within the mastoid labyrinth. The latter may be free from any suppuration, and yet the pus may be present somewhere near the tegmen of the tympanum, internal acoustic focus, transverse sinus, in the passages for blood-vessels and nerves,

etc. An early opening of the bone in the situation of the mastoid antrum will give the shortest outlet for pus and prevent any spread of suppuration over the meninges, transverse sinus, brain, large cerebral blood-vessels, etc. Now the antrum is situated upward and backward from the tympanic cavity and can be best and most easily reached through trephining exactly at the spot pointed out by the author. Dr. Mitzkuner adds, in conclusion, that he has already operated after his plan in two cases, and that with best results.—*Vratch*, No. 10, 1888.

IV. Treatment of Nasal Polypus by Cauterization with Nitrate of Silver. By DR. PARGAMIN (Belaia Tzerkov, Russia). A Jewish knife-grinder's boy, æt. 8 years, was brought to the writer with big, flesh-red, roundish new growths protruding from both of the orifices of his greatly swollen nose. The boy was looking wretchedly ill, pale, weak, emaciated, could articulate and breathe, but with great difficulty, and complained of constant headache and loss of appetite. According to the father's narrative the boy had been suffering from difficult nasal breathing for a considerable stretch of time, but of late he became very restless continually and could not sleep at all in consequence of an ever increasing great embarrassment of his respiration. When touched with a pincette the polypi easily bled. Partly this circumstance, partly the father's reluctance to any energetic surgical interference, induced Dr. Pargamin to give a trial to a thorough cauterization of the polypi with solid nitrate of silver. The procedure was followed by a paroxysm of violent sneezing as well as by the discharge of a sanguinolent fluid, but caused no pain.

"The results surpassed all expectations," the very first cauterization gave rise to considerable a shrinking of the growths as to enable the boy to breathe through his nose, though yet with difficulty, and by virtue of this, to quietly sleep for a couple of hours. After 7 cauterizations, of which the first three had been made daily, and the remaining only once a week, there could not be detected any trace of the polypi, while the boy got rid of all his troubles and got well. Dr. Pargamin emphatically recommends this plan of treatment, which is said to be (1) painless; (2) simple and easy, and can be practiced even by

the patient's relatives; (3) free from any danger of consecutive hemorrhage; (4) brings a considerable relief very rapidly. The writer tried in two cases of his another bloodless method of treating nasal polyp, consisting in the parenchymatous injection of 4 or 5 drops of acetic acid (as recommended in the *L'Abcille Medicale*, 1885), but he utterly failed to effect any improvement and was ultimately compelled to resort to evulsion. Dr. Pargamin mentions further that in cases of acute nasal catarrh in sucklings, he obtains good results from the intra-nasal instillation of a two per cent solution of hydrochlorate of cocaine.—*Russkaja Meditsina*, No. 39, 1887.

VALERIUS IDELSON (Beine).

V. On Removal by Operation of Naso-Pharyngeal Tumors. By THOMAS ANNANDALE (Edinburgh). Professor Annandale does not claim for the operation, presently to be described, entire originality. He demonstrates that when, after Rongé, the septum nasi is divided, and the alveolar border of the jaw and the hard palate cut through in the middle line, the two upper jaws can be separated to the extent of an inch, and thus more room obtained for the removal of tumors at the base of the skull. Of course, many tumors in this region can be removed by less severe operations; but cases occur where these are not sufficient and more room is required to operate through. The steps of the operation are as follows:

1. The exposure of the anterior nares by freely dividing the mucous membrane connecting the upper lip and upper jaws, according to the plan of Rongé.
2. The division of the bony septum of the nose along its attachment to the jaw.
3. Incising the soft parts along the middle line of the hard palate and then sawing through the alveolar margin of the upper jaw, and through the entire hard palate along the middle line. The soft palate may or may not require division in its middle line. The necessity for this depends on the size and attachments of the growth.
4. The forcible separation of the two jaws and the introduction through the gap of the finger, periosteal scraper, or other similar instrument, with the view of separating secondary connections of the growth to the surrounding parts.
5. The removal of

the growth from its primary site of origin by forceps, sharp spoon, cold snare, or the galvanic wire. 6. When the tumor has been removed the introduction of some antiseptic plug. The jaws are brought together and secured by one wire suture, and two or more horse-hair sutures through the soft part of the palate. Prof. Annandale relates three cases in which this operation was performed and they all proved, as far as the removal of the growth, most satisfactory. Two were benign growths. The third was a sarcoma and rapidly returned. Prof. Annandale claims for the operation the following advantages: 1. It is a simple procedure and if the growth can be removed by its aid no deformity results. 2. Should it be found that the growth cannot be properly exposed and removed in this way the proceeding forms one of the usual stages of a more severe operation, namely, the removal of the upper jaw itself, and, therefore, it assists and does not interfere with further operative measures. 3. That probably less blood is lost than in other cutting operations.—*Lancet*, Jan., 26, 1889.

H. H. TAYLOR (London).

CHEST AND ABDOMEN.

I. Duration of life in Cancer of the Breast. By W. ROGER WILLIAMS, F. R. C. S. (London). The statistics as to the duration of life in cancer of the breast both with operation and without operation vary very considerably. Paget gives the average as a little more than four years. Bryant agrees with this. Sibley gives 53.2 months in operated cases, and 32.25 months in non-operation cases. Gross' figures are 38.5 months operation cases, and 28.6 months non-operation cases. Mr. Roger Williams tabulates the cases for the last six years in the Middlesex Hospital. The average duration of life from the time the disease was first noticed is 60.8 months operation cases, and 44.8 months non-operation cases. He considers that probably Gross under-states the duration of life. In four of his cases life after operation lasted 137.6, 149.8, 159, 297 days. In four cases not operated on it lasted 116.6, 130, 157, 194.7 days —*Lancet*, Jan. 12, 1889.

H. H. TAYLOR (London.)

II. Tumors of the Mammary Gland. Based on 150 Cases From Czerny's Clinic. By DR. G. B. SCHMIDT (Heidelberg). The value of a comparative study of cases is greatly increased when the number is large, when they have occurred within a limited period of time and if possible have all been uniformly observed and followed up. These 150 cases occurred in the years 1877 to 1886 inclusive in Czerny's private and hospital practice. From explained causes there is an over-proportion of severe cases.

In 126 (82 $\frac{2}{3}$ %; Billroth found 82%) the tumor was cancer; 2 of these in males.

ETIOLOGY. 1. *Age, Gravidity, Lactation.* The ages ranged from 31 to 73 years. By tabular comparison with nine other observers, he finds the greatest frequency from 40 to 60, though there is a decrease after the 50th year. There were 52 under 48 years, 43 between 48 and 58 years, and 24 in the postsexual period. Of 122, 109 were married, 13 not—harmonizing with previous observers. Of 104 women, 83 had borne from 1 to 14 children; 56 had nursed, 32 not, 34 unnoted.

2. *Mastitis.* Winkel calculated from statistics of several thousand, that 6 out of every 100 lying-in women suffer from mastitis. Schmidt found that 109 women who had borne, 24 had suffered from mastitis; 22 once, 2 repeatedly; 17 of the later diseased breast, 3 of the not subsequently affected breast, 4 on both sides. But there was no time relation between the mastitis and the later cancer.

3. *Trauma.* This is etiologically on a par with mastitis. Previous injury was stated by 6 (intervals of $\frac{1}{2}$ to 6 years).

4. *Heredity.* Noted in 10. Three sisters and an aunt of one of these had also suffered from cancer. The acinous or medullary form occurred in 17 (average age 48 $\frac{1}{3}$ years), the tubular or infiltrating form in 36 (average age 49 $\frac{2}{3}$ years), scirrhus in 28 (56 years), and the colloid type in 1 (47 years.)

Of various clinical details it may be specified that in 94 of 111 the growth had become attached to the skin (after an average duration of 16.6 months), and 24 attached to tissues beneath (after an average of 15 months.) After involvement of the superficial layers of the skin a radial extension through the lymphatics (*lenticular infections*) occurred

in 14 (11%), amounting to cancer *en cuirasse* in 2. In 25 (20%) the skin had ulcerated (after an average duration of 19 months.) Scirrhus most frequently involves surrounding parts; the other forms grow rather towards the skin than the subtissues.

In 15 of 111 cases the axillary glands were free (average duration 13 months; average duration where these glands were involved, 15.8 months). That the infection of the glands stands in a certain relation to the involvement of the skin was shown by the fact that in 96 cases of the former the latter was observed 84 times. Hence in operating where the latter is found the former should be assumed to be present. Also in the 11 cases where the supraclavicular glands were affected (average duration $20\frac{1}{2}$ months), the skin had become involved. With other observers he does *not* find that the seat in the mamma gives any indication of the condition of the axillary glands.

TREATMENT. Average duration of growth at time of operation was 14.7 months. Of 125 cases, 104 were primary, 9 secondary, and 12 inoperable. In 94 complete cleaning out of the axilla was combined with the amputatio mammæ. Strict antisepsis of course; since beginning of 1883 permanent sublimate-woodwool dressing. Of 112 operated cases, 5 died directly afterwards—4 from erysipelas, 1 from fat embolism.

Of the remaining cases he has later reports from 72. Of these, 18 are still alive, 16 being free from any recurrence. These show respectively $10\frac{1}{4}$, 7 (2 cases), 6, 5, $4\frac{1}{2}$, 4, $3\frac{3}{4}$, $2\frac{1}{2}$, 2, (2) $1\frac{1}{2}$ (2), and 1 (3) years since the operation. One of these was operated twice. The other two relapses occurred $1\frac{1}{4}$ and $2\frac{1}{2}$ years p. o. The early operated cases do not show a larger proportion of cures, nor does any particular histological form. In all but 1 of the 16 the axillary glands were also removed. Many of these cured patients had trouble with arm (cicatrices, atrophies, circulatory disturbances, neuralgias).

He finds with others that most relapses occur from the 2d or 6th to the 12th month p. o.

There were two cases of epithelioma, one developing on the ulcerated surface of a fibroma, the other from a year old eczema of the mamilla (Hauser's case, 1886.)

There were 2 cases of mammary cancer in the male against 102 in the female, one a scirrhus, the other tubular tending to scirrhus.

Fibroma, sarcoma and adenoma of the mamma. Of these there were 21, 10, 1. The 11 cases of fibroma and fibrosarcoma occurred between puberty and the 40th year, and seemed to develop from a chronic form of mastitis. There was 1 round-cell sarcoma, 1 intracanalicular myxoma, 7 angiosarcoma, etc. A long table of cases completes the article.—*Bruns' Beitrag z. klin. Chirg.*, bd. iv, heft 1, '88.

WILLIAM BROWNING (Brooklyn).

III. Purulent Pericarditis Successfully Treated by Aspiration and Drainage. By DR. HOWSHIP DICKINSON (London.) A case of recovery after nine aspirations of the pleura and three of the pericardium followed by incision and drainage of the sac of the latter is distinctly an encouragement to those surgeons who would treat pus in the pericardium as they would treat it elsewhere.

When it is borne in mind that the origin of the mischief in Dr. Dickinson's case was pyæmic it will be confessed that a more unpromising case could scarcely be found. The difficulties which beset the diagnosis of pyo-pericardium coupled with the diffidence which the surgeon naturally feels in dealing with one leg of the 'tripod of life' probably supply the reason why its surgical treatment is seldom attempted. For the disease is not rare, though it not infrequently happens that cases die without any attempt having been made to relieve them by surgical means, and the fact that pus does sometimes become encysted and comparatively harmless in the pericardium may help to explain why the aid of the surgeon is not more frequently invoked.

It has usually been held that the fourth left interspace near the sternum, but avoiding the internal mammary artery is the most eligible spot for operation. But if the distended pericardium presents to the right of the sternum there will plainly be less danger of wounding the heart by dealing with it on that side and in the lowest interspace in which it can be made out, which probably will be the fifth.

The case of pyopericarditis associated with osteomyelitis recently reported by Mr. R. W. Parker would lead us to avoid attempting to wash

out the opened sac, at any rate on the occasion of its incision and until the pressure relations within the thorax have had time to re arrange themselves. Nor will any washing out be so likely to be needed if the fullest antiseptic precautions be adopted both in the preliminary puncture or aspiration, and afterwards when the knife is used.—*Clinical Society of London*, Nov. 23, 1888.

A. F. STREET (Westgate).

IV. Surgical Treatment of Purulent Peritonitis.—By DR. O. WITZEL (Bonn). In the treatment of a case of diffuse purulent peritonitis we are confronted with this question ; up to what point is it necessary, up to what point is it possible, to remove the septic contents, and how can this be accomplished in the most careful way? Several methods have been proposed ; the opening of the abdomen, turning aside of the intestines and removing the secretions by means of sponges has been proposed, but this is extremely dangerous.

Nussbaum and Tait have advised in these cases to open the abdomen by a small median incision and filling the cavity with fluid, and then turning the patient on the side, so that the liquid can run out. If the incision is small and the intestines much distended, only little fluid will run out ; if the incision be large, by turning the patient on the side the intestines will fall out, and in replacing them we give rise to as grave a condition of shock as by the first mentioned procedure. The washing out of the abdomen by means of a tube introduced in the wound has not been very successful, till Witzel thought of washing out the abdomen through several small wounds through which long drainage tubes were passed. The author experimented successfully on animals, and moreover had the opportunity of trying his method in three cases of purulent peritonitis. One case, that of a child, æt. 9 years, with suppurative peritonitis due to a perforation of the vermiform appendix, was operated on and a median and two lateral incisions were made through these incisions drainage tubes were passed and the washing out of the abdomen done thoroughly and rapidly ; the child seemed to improve after the operation, but died in sudden collapse 15 hours later.

A subacute ileus, after reduction en masse of a strangulated hernia complicated the second case. The abdomen was washed and drained as in the preceding case, but the patient only lived 24 hours after the operation. The third case, a child, *et.* 11 years, was brought to the clinic suffering from violent pains in right iliac region; these pains had begun four days previous and gradually extended over the whole of the abdomen which was swollen, and a resisting swelling was felt in the right iliac region. At the time of operation the pulse was 140 and very feeble.

An oblique incision in caecal region gave vent to $\frac{1}{2}$ litre of foul smelling pus. The vermiform appendix could not be seen by separating the edges of the wound, but a loop of intestine covered with pus appeared at the bottom of the incision; pressure over meso-gastrium and in right hypochondrium caused considerable pus to escape from the abdomen. A small incision was made in the median line, below the umbilicus, and another one in the left flank; the finger was then introduced in these wounds and gently separated the coils of intestine.

Through each incision, a long finger thick drainage tube was passed downward into the pelvis, then one passed right and left into the gutter on each side of the vertebral column, and through the median incision a tube was passed upward under the liver; furthermore, a direct communication was established by passing a tube transversely across the abdomen. Twenty minutes after beginning of the narcosis the eight drainage tubes were in position and the irrigation was begun, the nozzle of the irrigator being introduced in each tube in turn. Ten litres of a 6 per 1000 warm salt solution were used. The communication between all the tubes was perfectly free and the fluid escaped very freely. The irrigation caused no change for the worse in the general condition. Three hours after the operation the child felt much better, and the condition of the patient remained good for 10 hours, when the child began to sink rapidly and died 18 hours after operation, with symptoms of general septicæmia.

The autopsy showed that the removal of the septic matter from the abdominal cavity had succeeded thoroughly; in the meshes of the

omentum a few yellow flocculi were found. On the under surface of the liver there was a firmly adherent yellow coating of fibrin. The vermiform appendix was firmly adherent to the pelvic wall and contained a fecal concretion about the size of a cherry-stone.

The author advocates the treatment of septic peritonitis, not due to perforation of gut, in the manner described above.—*Deutsche Medicinische Wochenschrift*, No. 40, 1888.

F. C. HUSSON (New York).

V. Case of Perforating Stab Wound of Abdomen, with Prolapse of Bowels. By DR. M. G. TZITRIN (Syzran, Russia). A male peasant, æt. 50, of middling make and nutrition, was stabbed in the chest and abdomen with a knife and was at once brought to the Town Hospital. On examining the man (who was in a heavily intoxicated state) Dr. Tzitrin found, besides two superficial wounds of the chest, an oblique clean-cut incision, 3 cm. long, situated $2\frac{1}{4}$ cm. below the navel, and 1 cm. to the left of the linea alba. In the wound were tightly strangulated seven sausage-like, highly distended and cedematous loops of the small intestine, of a dark red color. Having washed out the (uninjured) prolapsed parts with a 2 per cent. solution of borax, the author proceeded to reduce them with fingers through the wound which was kept gaping by means of hooks. The procedure succeeded after 3 hours. The reduction could have been effected, very likely, much more rapidly after a slight enlargement of the cut. The author, however, abstained from the enlargement on the curious ground that "it might give rise to a more or less profuse hæmorrhage." The wound was closed with 4 silk sutures and dressed with iodoform. It healed *per secundam* on the 43rd day. The temperature never rose above 38.7° C. On the 44th day the man was discharged well.—*Russkaia Meditzina*, No. 19, 1888.

VALFRIUS IDELSON (Berne).

IV. Contribution to the Surgical Treatment of Acute Strangulation of the Intestine. (Ileus). By MAX SCHEDE (Hamburg). The author insists upon early diagnosis of acute strangulation of the intestine. The prognosis of surgical procedure depends

largely upon early operation. No disease causes such rapid sinking of the vital powers of the patient, and in none are the results of simple laparotomy so dangerous to the life of the individual. The prognosis is always better in those cases which have a stormy invasion. In the slow insidious invasions where the symptoms have existed some time, the integrity of the gut has been compromised before surgical aid is apt to reach the patient. The author tabulates his own cases, both operative and those in which the expectant plan has been followed. In those cases where the strength of the patient has been much exhausted, he advises postponement of the major operation for the radical cure of strangulation (laparotomy) and the substitution of the minor operation of making an artificial anus. The more dangerous procedure is advised after the strength of the patient has improved. Of 10 cases of acute ileus, the radical operation was performed by the author in 6. In only one case did definite cure result. In two cases the laparotomy was successful, but the patients died subsequently of pneumonia. In two additional cases he formed an artificial anus for the exit of fæces as a palliative measure, the patients being in bad condition for the operation of laparotomy; both of these cases were fatal.

The author also calls attention to the great mortality after operation in those cases of stricture of the gut due to carcinomatous growth. In these cases, symptoms, acute in the onset, may appear in subjects who never suffered from anything more marked than inordinate constipation. Cases of this character should be always examined under narcosis. Early diagnosis is also an important factor in the disease.—*Archiv. f. Klin. Chir.* bd. 36. heft 3.

HENRY KOPLIK (New York).

VII. On a Method of Operating so as to Lessen the Dangers of Exsection of Intestine. By E. HAHN (Germany). In cases of strangulated hernia with gangrenous intestine, resection of the intestine and suture of the divided ends was given up by the author after its first trial, owing to the bad results which followed it, but was adopted again when an examination of statistics seemed to show that better results followed after it than after the formation of artificial anus

whether with after treatment by the intestinal spur or secondary resection and suture.

The new method of operating is as follows: The peritoneal opening after the relief of a strangulated inguinal or femoral hernia is enlarged, and the intestine drawn down, ligatured above and below the gangrenous part and resected. The cut ends are thoroughly disinfected and stuffed up to the ligature with iodoform gauze, which is kept in place by a stitch. The ends of this stitch are left long so that when grasped by forceps passed through the mesial abdominal wound (to be afterwards made), they may serve to pull the ends of the intestine through. Next an incision, 6-8 cm. long, is to be made in the linea alba, extending from just below the umbilicus to the level of a line joining the two anterior superior spines. The centre of this incision will be nearly opposite the point where the mesentery crosses from left to right. The surgeon, after carefully protecting the divided intestinal ends from further contamination by inserting gauze into the original wound, now passes a pair of forceps from the mesial to the groin wound and draws them through by the threads left for the purpose. Afterwards he packs the groin wound with gauze and proceeds to inspect, trim and suture with fine silk the ends of intestine at the mesial wound. The mucous membrane is treated with continuous sutures, the peritoneum with Lembert's suture. After the sutured intestine has been again bathed with lotion (2 to 3 per cent carbolic preferred) it is returned into the abdominal cavity, but to prevent risk of escape of fæcal matter and to keep the sutured part in position strips of iodoform gauze are packed round on each side as far as the mesentery. The ends of the strips are left to project at the wound. The sutured part of the intestine is thus kept at the level of the parietal peritoneum, opposite the wound, and may be inspected at will by removing an extra piece of gauze which is laid over it. To keep the gauze in place and to prevent prolapse of intestine from a cough, two or three superficial stitches are inserted and knotted over the gauze. In very weak patients fluid food may be given next day.

As a modification of this method an artificial anus for crural hernia may be made in the middle line.

The advantages claimed for the above method consist:

1. In possibility of exact control of affected intestine and mesentery. This is especially necessary in some cases where thrombosis of mesenteric vessels has occurred.
2. In the facility of resection and of suture of the intestine.
3. In greater certainty of avoiding septic infection from the wound to the peritoneum.
4. In the protection of the sutured intestine, during healing, by the iodoform gauze.
5. In the safe conduction outward of fecal extravasation should the suture fail.

When in a crural hernia the artificial anus is made in the middle line, kinking and disturbance of the circulation is avoided, while the after treatment of the artificial anus is easy.

No opening in the middle line is required for the secondary suture of an artificial anus in the groin.

Up to the time of writing the author had had two cases of primary and one of secondary intestinal resection and suture, all of them successful.

[The author does not say how long he leaves the packing round the sutured intestine, nor how he closes the abdominal wall after the packing is removed.]—*Berliner Klin. Wochenschrift*, June 25, 1888.

CHARLES W. CATHCART (Edinburgh).

VIII. Case of Perityphlitic Abscess, Implication of Right Hip Joint. By HENRY C. RAWDON (Liverpool). A boy, æt. 6½ years, was suffering with disease of the right hip joint, with which was associated a large abscess. About six weeks before admission he was seized with a series of convulsive fits, which extended over a period of three weeks, on recovering from which the boy was found to be unable to walk, and complained of pain about his hips and knees. Shortly after coming under author's care, the head of the femur was excised, giving vent to a large collection of purulent matter occupying the upper and outer part of the thigh. The excised head showed little pathological change; the capsular and round ligaments had given way. The boy was much relieved, and progressed well for two months, al-

though the discharge was free. Subsequently he lost ground, and this led to a further exploration of the condition of the parts, the sinuses being enlarged so as to admit the author's finger. It was noted that the thigh on its upper and inner aspects was enlarged. Suspecting this to be pus, the author, as the finger could be passed from the outer to the inner side without difficulty, in order to reach the swelling, before opening it, tried the effect of firmly squeezing the part, as the result of which a large mass of firm fecal matter (a fair-sized motion for a boy) was slowly pressed out. The mass was three and a half inches long and three-quarters of an inch in diameter, and it had probably been lying between the vastus internus and the adductor magnus. The sinuses were washed out and drained, and the boy ultimately completely recovered.—*Medical Press and Circular*, March 28, 1888.

H. PERCY DUNN (London).

GENITO-URINARY ORGANS.

I. Upon Some Histological Changes in the Chronically Inflamed Male Urethra. By F. NEELSEN. The results of 14 sections are reported upon. Besides the excavating cicatrices situated principally in the posterior portion of the canal, the result of peri-urethral abscesses, attention is particularly called to cicatrices which develop without previous ulceration. These are restricted mostly to the mucous membrane, or the uppermost layer of the corpus cavernosum, and occasionally reached to a considerable depth. On these spots the overlying cylindrical epithelium of the urethral mucous membrane is changed into pavement epithelium. The glandular tissue completely disappears in the cicatricial tissue, or there is found an admixture of the latter with the round cells. The process of the cicatricial tissue formation is especially remarkable, through the unequal and group like spreading upon the surface of the mucous membrane. Infiltration of the gland walls is followed by atrophy and finally by complete destruction of the same.—*Vierteljahrschrift f. Dermatologie und Syphilis*, 1887.

G. R. FOWLER (Brooklyn).

II. Traumatic Lesions of the Penis and Scrotum. By DR. IVAN P. SELIVANOFF (Voronej, Russia). An athletic peasant, æt. 30 years, when trying to oil the revolving flywheel of a threshing machine, was caught by a strap, his trousers being entangled together with his genitals. When seen by the author 12 hours later, the "man was lying on a dirty floor at his hut, infested by myriads of flies," with flexed and widely separated thighs, between which "there was hanging a hideous, bloody and dirty mass of flesh." The whole scrotum proved to have disappeared together with the left tunica dartos, and the inferior half of the sheath of the penis, while the upper moiety of the latter was still present in the shape of an irregular shrunken flap attached to the right side, at some distance from the glands. The left testicle with its epididymis was wholly crushed, its tunica vaginalis lacerated; the right testis, however, as well as the body of the penis, were intact, while on the glans there was seen an extensive, though fairly shallow abrasion. Dr. Selivanoff's proposal to remove the crushed testicle and cutaneous flap was flatly refused. Nor did the man consent to be removed to a hospital near by. All that he and his family required from the doctor was "some lotion," in addition to various "medicines" of their own. Being compelled to accept the situation, the writer supplied the people with dressing materials, and gave due instructions in regard to nursing. In spite of "most murderous conditions" (including abominable dirt, flies, domestic doctoring, etc.) fever lasted but for a few days and "suppuration went on energetically." Still, the man was able to get up (with his wounds yet open) not before the end of two months. On examination about five months after the accident, there was found an insensitive, irregular contracted, cutaneous lump, 2 cent. high, 9 cent. in circumference, situated about 2 fingers' breadth above the right half of the glans. The remaining portion of the penis and the right testicle were covered with a soft shining cuticle. The left testicle was represented by "an indurated depression admitting a forefinger's pulp." The patient stated that erections, previously very painful, of late had become all right, but he had been abstaining from sexual intercourse, all through, since he feared that it might spoil the healing process. As before, he

declined any surgical interference, though he believed that the "biggest lump" might prove an obstacle to coition.—*Vratch*, No. 44, 1888.

VALERIUS IDELSON (Berne).

III. The Operative Treatment of Obstructive Prostatic Hypertrophy. By DR. MEINHARD SCHMIDT (Cuxhaven). The author reports in detail the case of a man, æt. 52 years, who for three years had suffered from symptoms of chronic cystitis and hypertrophy of the prostate. The patient was made the subject of the *sectio alta* by which the bladder was opened and emptied of some small sized calculi. The middle lobe of the prostate was then removed by means of excision. The writer used forceps and knife, removing the diseased lobe of the prostate piecemeal and mostly by his sense of touch. Hæmorrhage marked. There was good reaction of the patient from the operation, but there was no relief found from the bladder symptoms. There was still prostatic obstructions in the urethra. The patient was then made the subject of a second operation by which the median incision of the perineum having been carried out the urethra was opened and the prostatic portions dilated by incision with a probe pointed long scalpel and sound, a silver female catheter being then passed into the bladder. After this the patient carried a permanent soft catheter, of large size, in the urethra, after the method advocated by Harrison, of Liverpool. He was eventually completely relieved.—*Zeitsch. f. Chir.*, bd. 28, heft 4 and 5.

HENRY KOPLIK (New York).

IV. Castration for Primary Tuberculosis of Testicle. By DR. PAVEL A. GEIER (Kalüga, Russia). A strongly made and well-nourished married soldier, who had previously enjoyed flourishing health, noticed a gradual enlargement of the left side of his scrotum. He never had had either syphilis or gonorrhœa, or sustained any local injury. After a while he applied to a hospital, where an abscess (on the outer side of the scrotum) was detected and opened to empty a tablespoonful of bloody pus. An obstinate ulcer developed at the site of the incision to discharge a thin purulent matter ever

since, while the swelling did not decrease at all. When examined by Dr. Geier about four months since the first symptoms, the patient's left testicle was as large as a man's fist, and fluctuating anteriorly; the epididymis and adjacent portion of spermatic cord were hard and knobby, the scrotal skin adherent to the outer aspect of the testis and covered with several flabby depressed ulcers communicating with the organ by means of fistulous channels, about $1\frac{1}{2}$ cm. long. The right testicle was considerably wasted, but its epididymis enlarged. He suffered occasionally from pricking pains about the hypogastrium and left groin, but sexual impotence was absent. The inguinal lymphatic glands, as well as his lungs, in fact, all other organs of the body, presented nothing abnormal whatever. Primary tuberculosis of the testicle was diagnosed, and castration was proposed and accepted. Both the testicle (with the lower portion of the cord) and diseased area of the scrotum were excised, the operation being conducted under all antiseptic precautions. A rapid recovery followed. The patient, however, was dismissed from the service as an "unfit." The testicle removed proved to consist of a caseous mass in its lower portion, while the remaining parenchyma was traversed with small sized cavities, containing yellowish, tallow-like matter, and tubercles in all evolutionary stages (beginning with young, dense, new growths of a greyish-red color). No bacterioscopic examination was undertaken.

Dr. Geier mentions another similar case of primary tuberculosis of testicle, referring to a robust young soldier without any morbid trace about any other organ. The patient declined any operative interference, and similarly was discharged from the service on account of his "unfitness." The author believes, 1, that primary testicular tuberculosis occurs, generally, much more frequently than is supposed; (2) that the testicular disease can be followed by a systemic infection; and (3) that to prevent the latter, the surgeon when meeting a case of tuberculosis yet localized in the testicle must persuade the patient to remove the diseased organ.—*Proceedings of the Kaluga Medical Society*, 1887.

VALERIUS IDELSON (Herne).

V. Hydrocele Neonatorum. By DR. WILHELM WECHSELMANN (Schwerin). This is a statistical paper on the frequency of hydrocele in the new born. The author made his observations in the Maternity Hospital of Dresden. Among about 270 boys 37 were affected with hydrocele. Of these 14 communicated with the peritoneal cavity. Only two hydroceles were situated on the left side, and these were communicating. In four cases the hydrocele was double. Most of the hydroceles were the size of a cherry, though some reached the size of a plum or over. The author concludes that hydrocele is much more frequent in the new born than is generally supposed. The hydrocele in these subjects communicates comparatively often with the peritoneal cavity. The hydrocele is found mostly present on the right side and is probably of intrauterine origin.—*Archiv. f. Chir.*, bd. 36, heft 3.

HENRY KOPLIK (New York).

VI. A Criticism of Langenbuch's Sectio alta Subpubica. By JOSEPH SMITS (Utrecht). The author briefly reviews and adversely criticises a new method of lithotomy recently published by Langenbuch and reviewed elsewhere in this journal. He regrets that the author did not adhere to his former (1881) endeavors to further elaborate Vidal de Cassis' method of performing the high section in two sittings.

[We may here briefly state that Langenbuch's present method consists in effecting an entrance into the bladder between the penis and the pubic arch.]

The author condemns Langenbuch's method of drainage in the after-treatment (consisting in the insertion of the tube through the perineum) as liable to injure the arteriæ pudenda interna and transversa bulbi. Furthermore the method only holds good when the arteriæ dorsales penis are normal in their course and origin, which is not always the case. Injury to the dorsal vein of the penis cannot always be avoided, nor is the opinion of many physicians, that this may cause impotence, to be entirely set aside. Cutting of the plexus santorini may occasion the malady called by Tillaux *cystite variqueuse*; and

cellulitis may ensue from severing the connection between the prostatic portion of the bladder with the symphysis.

The opening made cannot, in the opinion of the author, be large enough to permit the extraction of any but the smallest stones. Finally the operation is of no value in the case of children, for various reasons.—*Deutsche Zeitschr. f. Chir.*, Bd. 28, Hft. 3.

W. W. VAN ARSDALE (New York).

VII. Perineal Lithotrity. By REGINALD HARRISON, F.R.C.S. (Liverpool). The one great advantage of lithotomy over lithotrity is that it permits the surgeon to digitally explore the interior of the bladder, and so satisfy himself that no fragments are left behind. Mr. Harrison believes that many recurrences after lithotrity are due to some purely mechanical cause which either the operation or the operator fails to meet. He agrees with Mr. Donald Day's classification of the causes of recurrences, viz., (a) stones formed quite independently of the previous ones; (b) stones undetected at the first operation; (c) stones formed on a fragment left behind at a former operation; (d) includes stones of bladder formation, due to chronic cystitis. It appeared that three-fifths of the recurrences in Mr. Day's table were traceable to purely local causes, in which the bladder including its outlet was involved. Perineal litholapaxy would be well suited to cases in which it was required to (1) digitally explore the bladder and associated parts, both before and after removal of the stone; (2) the rapid evacuation of the stone; and (3) drainage and irrigation of the bladder should it be necessary.

Mr. Harrison has performed the operation in four cases, viz., three in which the prostate was enlarged, and it was deemed expedient to drain the bladder after removal of stone. In two instances litholapaxy had been previously performed. In the fourth case the stone was very large and could not be grasped in lithotrite. After the bladder was entered from the perineum the stone was easily crushed and removed. It was washed out with a solution of perchloride, and a large drainage tube inserted which was left in four days. Patient was well and up on the eleventh day passing all his urine per urethram. Mr. Harrison concludes "I hardly think I need apologise for bringing under notice

an operation which may, in some cases, be revived with considerable advantage. Circumstances are now very different from what they were twenty-five years ago, when perineal lithotrity had many advocates. Thompson had not then taught us the great value of digital exploration in diseases of the bladder; Otis had not demonstrated the full capacity of all parts of the male urethra to dilatation; Bigelow had not shown us the tolerance of the bladder to prolonged but gentle manipulations; nor had we learnt the value of drainage and irrigation of the bladder and how much operative surgery was capable of doing for enlarged prostate when this was found to complicate stone. In the presence of these advances, I believe that perineal litholapaxy will be found of considerable service, and that its more general employment will tend to reduce the number of stone recurrences after litholapaxy as usually practiced."—*Lancet*, Sept. 22, 1888.

H. H. TAYLOR (London).

VIII. 139 Cases of Lithotomy. By DR. ASSENDELFT (Nijni-Novgorod, Russia). The author performed 139 operations of lithotomy, from 1881 to 1887. He came to the conclusion that lithotomy cannot be successfully performed in country practice. The author performed lateral lithotomy in 38 cases, of which 3 resulted in death, due to pyelonephritis. He is opposed to this operation, as in 35 of his cases he had observed hæmorrhage after the operation. In these cases the wound healed in from 16 to 20 days.

In 2 cases (both complicated) median lithotomy was performed, a fistula remaining in each case.

Since 1883, he has performed exclusively high lithotomy, 102 cases, all told. The result was as follows: 2 patients died on 17th and 18th day after the operation, but one of them died not from the operation. 98 patients recovered. Of the two remaining patients one is yet suffering from a fistula, and the other is afflicted with pyelitis. In two-thirds of his cases he was assisted only by sisters or nurses, no other surgeon being present. The incisions into the skin were made from 4 to 8 cm., and those into the bladder from 2 to 4 cm. Hæmorrhage was considerable less than at the lateral operations. In no case

was the peritoneum wounded. He put ligatures into the bladder in all cases where the urine was normal.

As to age the patients were subdivided as follows :

From 2 to 5 years	35 Cases.	From 15 to 20 years	13 Cases.
5 to 10 "	3 "	" 20 to 25 "	3 "
" 10 to 15 "	19 "	" 25 to 29 "	7 "

Seven patients had two stones each, and one, five stones. In 74 cases the weight of the stone was as follows :

Number of patients.	Age.	Average weight in grammes	Maximum weight.	Minimum weight.
4	2—5	5.4	23	0.3
7	5—10	6.15	22.6	0.8
14	10—15	10.97	25.	0.8
8	15—20	22.0	45.5	1.7
"	20—25	12.73	30.2	10.0
"	25—29	30.08	113.3	4.0

The post operative course was in 74 cases as follows :

Number of patients	Age	No fever	Slight fever.	Severe fever.	Prolonged course.	Death.
4	2—5	14	0	1	5	2
7	5—10	12	4	4	2	....
14	10—15	7	5	5	1	....
"	15—20	2	2	5	1	....
8	20—25		2		1	....
"	25—29		3	1	1	....
74		31	14	12	11	2
Percent		41.9	24.3	16.2	14.4	

Out of these 74 cases, in 20 the wound healed *per primam*, in 17

the edges separated near the drainage tube, in 33 they separated at full extent, and in 2 the scar was much extended.—*Vratch*, St. Petersburg, Nos. 16-27, 1887.

P. J. POPOFF (Brooklyn).

IV. Sarcoma of the Bladder. By F. A. SOUTHAM (London.) At the beginning of this paper, Mr. Southam, by quotations from Stein, Reginald Harrison and Thompson, shows the existence of a belief that sarcoma of the bladder is a very rare growth. In suggesting that the opinion is not well founded, he draws attention to the fact that out of eighteen cases of tumor of the bladder under the care of himself or his colleagues during the last two years, six, or one-third of the whole number, were sarcomata, a proportion that is exactly the same as that in a group of six cases recently described by Sir Henry Thompson.

Basing his observation on the six cases which came under his examination, Mr. Southam comes to the following conclusions :

Etiology.—On this point he has of course little definite to say. In most of the recorded cases the growth was primary, though in four cases the bladder was affected by extension from a neighboring organ, while in two interesting cases the bladder tumor was preceded by sarcoma in the cranium and eyeball. In a few cases the tumor was associated with passing gravel or small calculi, but that "the growth appears to have been directly due to local irritation," I think it would be difficult to prove. Stricture of the urethra, urethritis, enlarged prostate, etc., are mentioned as probable causes, and Mr. Southam supports this idea by citing the fact that the growth is much commoner in males than in females. But that long-continued local irritation gives rise to tumor-growths would, I think, be more readily admitted in the case of epithelioma than of sarcoma; while a consideration of the age of the patients would further induce one to discard such irritation as a cause. For in an interesting table Mr. Southam shows that out of thirty-four recorded cases, ten occurred in patients under ten years of age, a larger number than occurred in any other "decade," and an age which is necessarily freest from these causes of local irritation, ex-

cept, of course, calculus. He makes, however, the interesting suggestion that papillomata may after a time "take on sarcomatous action," and, indeed, mentions an important case under his care, in which, after he had removed a papillomata, a recurrence took place, part of the second growth being distinctly sarcomatous.

Age and Sex.—There are two periods at which the growth occurs much more frequently than at any other, viz.: under ten, and between fifty and seventy years of age; while it is apparently more than twice as frequent in males as in females.

Origin, Situation, Structure.—Primary sarcoma of the bladder originates in the connective tissue of the sub-mucous layer, and it seems to attack the base of the organ most commonly. In most cases the growth projects into the bladder in one or more distinct tumors, the majority being sessile, with a broad attachment. Though in that they differ from papillomata, they may resemble the latter in being distinctly villous on the surface. But Mr. Southam mentions the important fact that if these villi be examined, in addition to capillary vessels the stroma will be found to contain numerous cells either round or spindle-shaped, similar to those making up the bulk of the growth. The growth usually remains confined to the walls of the bladder, though it may invade neighboring organs.

Condition of Bladder and Kidneys.—Chronic cystitis is of course produced; in one case ulceration and perforation of the wall took place, while in another the bladder was ruptured in consequence of retention of urine. Dilatation of the pelvis and calyces of the kidneys, with absorption of the kidney structure, has been found; also suppurative pyelitis and nephritis.

Symptoms.—These closely resemble the symptoms of other tumors of the bladder. Hæmaturia is prominent. In most cases it precedes—sometimes by a period of years—painful and frequent micturition, as in cases of papilloma, though, on the other hand, it may be a later symptom and produce a resemblance to cancer, in which difficult micturition is the earlier symptom. The bleeding is often profuse, clots being passed, and it is increased by the introduction of instruments. Painful and frequent micturition, sudden

stopplings of the stream, retention and incontinence of urine are also mentioned as symptoms. It is very important to note that Mr. Southam states that only very exceptionally are distinct portions of growth met within the urine, and he indicates this as a point of difference from papilloma. In none of his six cases were particles of the tumor found in the urine. If the growth be firm and large, it may be discovered by rectal or vaginal, or bimanual examination, and if the sound be used, it will be felt as a soft, smooth fulness, without the irregular and hard sensation of a cancer. But all these methods are sometimes fruitless, in which case it is suggested to wash out the bladder with a stream of water in the hope of detaching some fragments for examination. In females the constant straining sometimes terminates the difficulty by presenting the growth at the orifice of the urethra.

Diagnosis.—From this it will be seen that the diagnosis of sarcoma from other tumors of the bladder is often impossible. To distinguish a soft tumor from papilloma and a hard one from cancer will often be very difficult. Mr. Southam suggests that the age of the patient may be of assistance, as sarcoma is common in young subjects, while papilloma and cancer are not. But this cannot be said to be of much avail, as he has himself pointed out that, though the largest proportion of cases of sarcoma occurs under ten years of age, the next highest number is found between the ages of fifty and sixty, and the next again between sixty and seventy.

Treatment.—Removal by forceps or sharp spoon is advised, if possible through a perineal opening in males, or the dilated urethra in females. "In all cases, however, * * * more complete access will be obtained through a supra-pubic opening. In one instance the growth was removed by supra-pubic cystotomy, after exploring the bladder from the perineum, its diffuse nature rendering its extirpation by the latter route impracticable." The supra-pubic method should be at once adopted in all males, I think, unless the previous examination has very definitely proved the narrow attachment and easy accessibility of the tumor—conditions not easily ascertained by examination. In females I think it should be very seldom necessary. Mr. Southam advises operative interference in all cases as "life is undoubtedly pro-

longed, and symptoms are relieved by a removal of the tumor though this may not be complete." He mentions recurrence as taking place at three, six and nine months after operation, though he mentions one brilliant case in which "a very diffuse growth was removed" and yet "nearly a year has now elapsed, and the patient is still in the enjoyment of good health and free from any bladder symptoms."—*Medical Chronicle*, June-July, 1888.

JOHN SHAW McLAREN (Edinburgh.)

REVIEWS OF BOOKS.

DIE PERMANENTE EXTENSIONS BEHANDLUNG. DIE SUBCUTANEN UND COMPLICIRTEN FRACTUREN UND LUXATIONEN DER EXTREMITÄTEN UND IHRE FOLGEN. VON Prof. Dr. BARDENHEUER. Stuttgart, Ferd. Enke. 1889. New York, G. E. Stechert.

THE USES OF PERMANENT EXTENSION. SUBCUTANEOUS AND COMPOUND FRACTURES AND DISLOCATIONS OF THE EXTREMITIES AND THEIR CONSEQUENCES.

But a short time ago the voluminous work by the same author, entitled "The Injuries of the Upper Extremity," being the 63d vol. of the "Deutsche Chirurgie" of Lücke and Billroth, was noticed in this journal; and it was there mentioned that the author was much in favor of extension by weights as a treatment of certain injuries which were not generally so treated. In the present volume he passes in review all the fractures and dislocations, with special consideration of the treatment; and for almost all injuries mentioned he has devised a method of treatment by permanent extension. This forms the second or special part of the work. The first part deals with statistics, the general anatomy and pathology, general symptomatology, general diagnosis and treatment of fractures and dislocations.

For six years the author has occupied himself in improving the technique of, and extending the indications for, the method of permanent extension. He was led to generalise the treatment by extension by the excellent results gained in fractures of the femur, by combining the simple longitudinal extension (Buck's extension) with the action of weights attached laterally to the fractured limb, and having for their object the correction of lateral displacements, as well as of rotation, etc. During this time new points of view were continually added, as bones and joints other than the thigh were so treated, and all the improvements suggested by increasing experience are now embodied in the present work, which is, consequently, quite voluminous (810 pages,

large 8vo). Over 200 illustrations facilitate the explanation of the author's intentions.

It affects the reader with some surprise to view the manifold methods adopted by the author to achieve better results than by the usual methods employed for injuries of the extremities. But after reading what advantages the author claims for his methods, he feels inclined to put them to the test, in spite of the increased trouble and vigilance called for on the part of the surgeon, and the necessity of remaining in bed on the part of the patient, not to speak of the painfulness of the procedure in some cases. Although the wisdom of pushing one idea too far may be questioned, the thoroughness and carefulness of the work done, together with the renown of the author, combine to give the book a first place among others on the same subject.

VERGLEICHENDE BEURTHEILUNG DER VERSCHIEDENUEN METHODEN DES STEINSCHMITTS BEI MANNERN. von Dr. JOSEPH SMITS. Tübingen, Franz Pietzcker. 1888. New York, G. E. Stechert.

CRITICAL COMPARISON OF THE VARIOUS METHODS OF LITHOTOMY IN THE MALE.

This pamphlet of 88 pages owes its origin to the dissertation of the author on the same subject, and gives a description and comparative estimate of all the methods used for the operation for stone.

A very complete list of the literature of the subject precedes the text. A short chapter is devoted to the general history of lithotomy, the history of each special operation being given under the various special headings. Descriptions of the operations are given in full, with the experiences and views of various operators upon them. Statistics are given, showing the relative value of each operation. Occasionally notes of unique cases are introduced. The last chapters are devoted to comparison between the methods. It need hardly be stated that the author's conclusions are in favor of the *sectio alta*, and of this operation being performed in two sittings.

Altogether, the pamphlet bears ample evidence not only of diligent and faithful reading, extended to a much wider range of literature than is usually found among German writers, but of a clear comprehension of the salient points of the questions discussed.

W. W. VAN ARSDALE.

TRAITE DES RESECTIONS ET DES OPERATIONS CONSERVATRICES QU'ON PEUT PRATIQUER SUR LE SYSTEME OSSEUX. Par le Professeur L. OLLIER, de Lyon. Tome II. Membre Supérieur. Paris, G. Masson, 1889, pp. 614.

RESECTIONS AND CONSERVATIVE OPERATIONS ON THE OSSEOUS SYSTEM. By L. OLLIER, of Lyons.

This book is the second volume of an elaborate and thorough treatise on resections, and comprises all the conservative operations which can be done on the skeleton. The second volume is entirely limited to the upper extremity, that is, the shoulder, arm, fore-arm and hand.

The historical notice preceding each chapter on resection, together with the valuable chapters on the post operative treatment of the patient, and on the method used in palliating or obviating the deformities, add greatly to the interest and value of the book.

The last chapter, some 18 pages in length, is entirely devoted to the growth of the upper extremity after the various resections practised upon it, and the causes which may give rise to disturbances in the growth of its various segments.

This volume gives an admirable presentation of the successful work done by this eminent surgeon, specially since the introduction of antiseptics in surgery.

Up to December, 1887, Ollier resected the shoulder-joint 30 times, and he divides his cases as follows: For acute or chronic osteo-arthritis, 25 cases; for irreducible dislocations, 2 cases; for neoplasms, 1 case; for traumatism (gun shot wounds), 2 cases.

Both cases of resection for gun shot wound died, the first from cardiac disease three days after operating, the second ten days after, from an uncontrollable diarrhoea from which he had been suffering for four days previous to his being wounded on the battle field.

Of the other cases of resection of the shoulder, only one death was directly due to the operation; that was of pyæmia. In six cases, the resection of the shoulder did not seem to check the progress of the tuberculosis, and the patients died from their trouble, at a time varying in 1 case 10 days, and another 10 months from the date of operation. The age of Ollier's patients ranged from 12 to 60 years. The elbow-joint was resected 169 times by Ollier, with the following results: 64 times in preantiseptic days, with 10 deaths or a mortality of 15.38 per cent, and 105 times since, with two deaths or a death rate of 1.90 per hundred.

The patients ranged in age from 21 months to 72 years, and the disease was more frequent on the right side than on the left. The ultimate results are excellent, only two flail joints and four cases of complete ankylosis occurring in his series.

Ollier calls attention to the fact that in the thirty (30) cases of resection of the elbow done for orthopædic purposes ; no deaths occurred.

M. Ollier resected the wrist-joint 43 times, and five patients died either as a result of the operation or a short time after, of the five deaths two occurred in preantiseptic days. Since 1877 he resected the wrist in 38 cases, with 3 deaths ; one of these was due to shock, for the patient's leg was amputated at the same time that his wrist was resected, the patient having been badly mangled by a fall.

The book is clearly written, profusely illustrated by 156 wood cuts, and is deserving of the careful perusal of every surgeon.

F. C. HUSSON.

ON SUBLUXATION OF THE HEAD OF THE RADIUS IN CHILDREN—WITH A RESUMÉ OF ONE HUNDRED CONSECUTIVE CASES.¹

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THE lesion to which I beg to call attention is generally observed under the following conditions :

A child is brought to the physician by its mother complaining of pain at the wrist, and inability to use the arm. The child lets its arm hang motionless at its side, slightly flexed at the elbow, the hand being half-way between pronation and supination.

Upon further questioning the mother tells how she was leading the child by the hand when it stumbled or slipped, and in an effort to save it from a fall, she forcibly jerked the hand upward. At this moment she felt a click at the wrist, and the child cried out as if in pain. Although the child did not fall, yet since that time it has not used its arm or hand, and any interference with either has again called forth complaints.

On examination everything about the hand is found to be normal. The movements at the wrist are free and not painful, adduction and abduction, flexion and extension can be made passively without resistance.

Examination of the elbow-joint reveals no deformity whatever ; the olecranon, the condyles of the humerus, are all in place, and so is the head of the radius. At this point of the examination, however, the first abnormal symptom is discovered ; pressure, even if slight, upon the head of the radius is painful. Flexion of the fore-arm upon the upper arm is now

¹Read before the Surgical Section of the New York Academy of Medicine.

attempted, and is freely permitted to an angle of about 60° when the movement causes pain and is actively resisted by the child. Complete extension to the straight line is also painful; but any flexion ranging between 130° and 60° may be given the arm without resistance, and is generally retained by the child. The child never supports the hand with the other uninjured one, however, as in cases of injury to the shoulder.

If pronation and supination be now attempted while the arm is held flexed at right angles (apparently the easiest position for the child) the child immediately evinces symptoms of pains. Complete pronation is possible, but is somewhat resisted by the child. Supination, however, at once calls forth energetic protestations; the child cries out and actively resists the motion as much as it can, interferes with the other hand, and endeavors to escape. There also appears to be some mechanical resistance to supination which asserts itself as soon as the intermediate position between pronation and supination is reached. But on forcing supination still further, a distinct click is to be felt at the elbow, or more correctly at the head of the radius, after which all the movements of the arm at once become free, and apparently cause no more pain. One symptom, however, still remains; direct pressure on the head of the radius is painful as at first.

If, now, the arm is left to itself, the child lets it hang as before, and uses it little or not at all. And in two or three days the child may be brought back to the surgeon with considerable swelling, both of the elbow-joint and at the wrist, and with all the symptoms just described present, only in a much aggravated degree.

If, however, the arm is put up, the elbow flexed at right angles, the hand midway between pronation and supination, in some simple splint or bandage, the child is brought back by the mother at the end of three or four days, who says the hand must be well now, as the child uses it and complains no more.

On removing the bandage the arm generally appears normal, and passive and active movements are entirely free.

This is the clinical picture for which I have used the term subluxation of the head of the radius in the title of this pa-

per, but which has been described by various writers under different designations, such as partial dislocation of the head of the radius, dislocation of the radius downward by elongation, Goyrand's injury, and others.

These are very formidable titles for an injury which can be so easily rectified, and cured in so brief a time. And it should be here stated that the injury in question is not a dislocation, as that term is usually accepted ; there is no extensive rupturing of ligaments, nor have the articulating surfaces of the bones been laterally forced out of their normal position to any great extent.

The injury is comparatively slight. But, notwithstanding, it always occurs in the same typical manner, which should entitle it to acknowledgment as a separate and distinct injury. And in point of fact the lesion has been so recognized by a long line of observers—a fact which never would have occurred if the injury did not possess sufficient individuality to enable it to be recognized by others from simple description.

Now it is a curious fact, that although this injury has been often observed and frequently made the subject of careful inquiries, its nature is not perfectly understood, nor is the injury itself sufficiently widely known to prevent its often escaping detection. At any rate all authorities are certainly not agreed as to its nature ; and it is this air of mystery which envelops the lesion, that lends to it a special interest. All of these reasons have prompted me to bring the subject before you to-night for discussion.

A cursory glance at the literature informs us that there have been about seventy articles written on our subject, mostly in periodical literature. The text-books, if we except the more recent ones, contain little or nothing about it. Histories of the subject are given by Malgaigne and Streubel, and others since then. Hippocrates and Celsus referred to the matter. The first who described it accurately, however, was Fournier in 1671. But after his publication it was again forgotten, till, in 1751, Duverney again described it. Subsequently it became a favorite subject among French authors.

In Germany Streubel was the first to give the subject special attention, writing his first article in 1850.

By that time it had already been described in Italy by Monteggia (1814), and in England by Collier (1836) and Gardner (1837).

In our own country it was first brought forward by Batchelder in 1856, and Hodges in 1862, and subsequently treated of by Cushing, Moore, Van Santvoord and others; while the special attention given to it by Hamilton and Stimson in their textbooks has rendered the subject a familiar one to most surgeons.

I propose, before introducing my own cases, to give a brief epitome of what we learn from the literature.

Reference is made to some 400 cases in all (at a generous estimate). Yet many consider the injury a rare one. Goyrand who alone saw half this number (200 in 30 years), says it is very frequent. The general opinion is, that while the injury is rare among surgical cases in children, it is comparatively frequent among injuries to the elbow. According to Hoffmann the proportion is about 1 in 230 patients (children). This is probably the usual frequency for dispensaries.

As a predisposing cause we find a "lymphatic" or "strumous" constitution frequently mentioned by those writers who give it attention. An atonic or relaxed state of the ligaments is a favorite theory with most writers on the subject (Sylvester, Martin, LeLyon, Denucé). Bourgnnet, however, states that the children are exceptionally healthy and sound, and show no traces of constitutional tendencies.

As to the exciting cause of the injury, there is an overwhelming testimony in evidence of traction on the hand or forearm—so much so that this point has always been considered of the first importance in diagnosis. Whether the traction is exercised by the nurse when walking hand in hand with the child, by lifting it over an obstacle or over the gutter, or by trying to sustain it when it is about to fall, or by swinging it around by both arms in play, is comparatively of less importance. In every case the weight of the child, or part of the weight, is sustained by the arm. In some cases the distension of the arm in thrusting it through the sleeve of a jacket is cited as a cause.

The question of forced pronation of the hand simultaneously

with extension has been much discussed. Bottentnit, Bourgné, Malgaigue, Goyrand, von Pitha, Streubel, Hoffmann, Hoffa, all insist that pronation during extension causes the injury. Allowance should, however, be made for the fact that most of the authors wrote at a time when dislocations of the radius were believed to be possible from forced pronation alone. Later writers attribute the injury more to extension with forced adduction in the elbow. Supination is also represented as causing the injury by Danyan, Rendu and Hutchinson, while a fall is given as a cause by Bardenheuer, Duverney, Lindemann and Peterson.

The greatest harmony prevails in the symptomatology of the injury. With few exceptions, the authors describe the hand as being more or less pronated, the arm hanging motionless by the side with the elbow slightly bent. A few cases where supination obtained, instead of pronation, are mentioned as exceptional. Some writers lay especial stress on the opposition to supination encountered in active as well as in passive rotary movements.

The click heard on attempting supination for the first time after the injury is denied by none. Most all writers have noticed it and do not fail to attribute great significance to it. Only Streubel, in his second essay (1861), and Bardenheuer, in his latest works, attach no importance to it, saying crepitation in joints is something so common that it hardly deserves mention.

It is impossible to escape the impression that this click or snap so distinctly heard on supinating the fore-arm soon after the injury has been the main cause of all the mystery connected with the lesion. For to it alone is due the diagnosis of luxation or subluxation, so frequently made in these cases. The analogy with the snap heard in other joints during reduction of a dislocation appears unquestionable, and the freer motion after the snap has been heard renders the similarity still greater.

There is one point, however, which fails to complete the

¹In a case reported by Perrin, as soon as the snap was felt on reduction, the child cried out: "Mother, I am cured."

analogy between the injury under discussion and other dislocations. The head of the radius can be distinctly felt in its proper place, or, at least, *very near* its proper place. And as no unchallenged cases happen to have died with the dislocation (if such it be) unreplaced, the anatomy of the lesion could never be entirely made out. In consequence room was left for the widest speculation; and the theories advanced to substantiate the diagnosis of the various authors form the principal attraction in the publications. Almost all the tissues coming into contact with the radius have, one after another, been made the subject of special theories, not excluding the muscles and the nerves.

1. Many writers, among them Dugès, James, Lindemann, Monteggia, Snedden, Holmes, Hodges and Hamilton, believe that the lesion consists in a slight anterior displacement of the head of the radius in front of the radial eminence of the humerus, an incomplete luxation of the capitulum radii. The edge of the radial cup is imagined resting against the eminence which should receive the cup. Notwithstanding, the radial head is not imagined as entirely leaving the ulnar notch, for if it had done so the displacement could not escape notice on palpation. Nor are the ligaments said to be torn, but only stretched sufficiently to allow of subluxation within the capsule. If, now, supination is made, the radial cap again slips over the eminence and a corresponding click is heard. The question as to what holds the head of the radius in its abnormal position during the persistence of subluxation is answered by some writers by saying that the elastic contraction or tonus of the muscles uniting the fore-arm with the upper arm maintain the position.

The difficulty encountered here is to reproduce the subluxation in a post-mortem specimen, which should show as little deformity as we find in the actual lesion. If the radial cup is brought forward sufficiently for its edge to rest against the eminence, the head of the radius must be displaced out of the ulnar notch; and if this is done the deformity is so apparent that it is easy of detection, and could not possibly have remained unappreciated for nearly two centuries.

The same objection holds good against the theories of par-

tial dislocation of the head backward. Martin and Boyer were advocates of this theory, and Malgaigne, Poinsoy and others admitted both the anterior and posterior types of the displacement.

Goyrand who at the time of writing his first paper (1837) believed in an anterior partial displacement of the head of the radius, imputed it to the action of the biceps as did also Lindemann. It is true that the biceps attaches to a point (the radial tuberosity) which might easily so displace the capitulum radii, provided the elbow were a little flexed; and we may also imagine that at the moment a child were lifted by the hand, it would forcibly contract its biceps. But I have convinced myself by experiment upon the cadaver of a child that the biceps alone is not strong enough to displace the head of the radius. Even when the *lacertus fibrosus* has been removed the muscle tears, before the least injury is done to the joint, or any subluxation is achieved.

3. A curious theory was put forward by Gardner (1837) and Rendu (1841). In extreme pronation the tuberosity of the radius was thought to slip below the internal edge of the ulna, and by becoming locked there, to make supination impossible.

4. Bourgnat, later on, varied this theory by supposing that the locking was brought about more completely by the interposition of soft parts (*innoc. supinator brevis*, etc.), between the radius and ulna at a point, which prevented the return of the tuberosity.

Goyrand and Streubel carefully refuted these theories by showing that there was too large a space between the bones of the forearm in children for them to become interlocked. Moreover it is impossible for tissues to get wedged in between the two bones, unless there is extensive laceration—which, from the nature of injury under consideration, must be excluded.

5. Goyrand's latest theory was the partial dislocation of the triangular cartilage backwards at the wrist, in order to explain what he formerly supposed to be subluxation of the head of the radius. The wrist symptoms play so important a part in the clinical aspect of the cases that it is not surprising that the lesion should be looked for at this point.

Goyrand succeeded in getting a partial dislocation of the triangular cartilage on the cadaver by forced pronation, but the cartilage did not retain its abnormal position when the force was relaxed.

In spite of Goyrand's close study of the subject and the fact that he has observed the greatest number of cases on record,—which lends the greatest authority to his opinion, his theory has not been accepted by subsequent writers; principally from the reason, I believe, that a luxation, partial or otherwise, could not be made out clinically, at the wrist.

6. Hofmokl of Vienna has viewed the subject in a somewhat different manner. He thus describes his cases:

“The lesion occurs generally by suddenly pulling the child upwards by the hand, when it was about to fall, the hand itself being frequently not rotated at all. (In other cases a fall may account for the injury). The child lets the arm hang down as if paralyzed, complains of pain in the wrist and experiences pain on attempting to lift, or bend, or extend the forearm. The posture assumed is pronation, and slight flexion. There is very slight or no swelling at all over the radio-brachial joint; but immediately after injury (but only for a limited time) crepitation can be felt on supinating the forearm. This crepitation can be reproduced by repeated supination, after first again making forced pronation, and the head of the radius appears not to take part in the motion. After supination no pain is felt. But if no supination is practiced, pain at the wrist asserts itself.”

This description tallies exactly with the one given by experienced observers of the injury under discussion. In these cases Hofmokl diagnosticates fracture of the capitulum radii inside the capsule; and he has observed on the cadaver that such a fracture can be easily produced by attaching a weight of two pounds to the radial tuberosity and letting it fall a few feet. As the biceps-muscle in a child of 2 years will well bear a strain of ten pounds without rupturing (according to my own experiments), this theory appears to me worthy of consideration.

7. Chassaignac has described a number of very similar cases under the title of painful paralysis in young children, whose

age is given as from 2 to 4 years. The cause is some traction, more or less forcible, made on the hand or forearm, and its appearance is always sudden. No surgical lesion is found on examination, but frequently soft crepitation in the joints. There is a paresis of the muscles accompanied with pain, which prevents free motion. The arm hangs in pronation, with slight flexion at the elbow. Recovery takes place spontaneously after four or five days, more frequently in forty-eight hours. The author accounts for the lesion by assuming an injury to the nerves.

The similarity of the description to that given above is so striking that we are justified in including the cases in this paper. Especially as Hamilton too hinted that a nervous lesion might account for the symptoms of the injury.

I have left till the last a theory which has been steadily gaining in favor since it was first substantiated by Streubel. Its originator was Fournier; and Duverney more accurately described it. According to this author, on extension being made by the hand, the head of the radius moves downward in the orbicular ligament, so that a diastasis occurs between the cup of the capitulum and the eminence of the humerus. There is no lateral displacement of the radial head, nor is there any laceration of ligaments. This is what has been called displacement by "elongation."

The obvious objection to this theory is that there is no apparent reason why the injury should persist. On relaxation of the extending force the head could be expected to slip back again into its normal place.

This difficulty was overcome by Perrin who believed the head of the radius to be pulled out so far that its margin caught against the lower border of the ulnar notch. This theory is hardly tenable in view of the anatomical facts.

I believe Streubel (1850) was the first to advance his most successful theory, that the return of the head of the radius so well within the orbicular ligament was prevented by the folding in of the sides of the capsule between the radial head and the eminentia cepitata.

He based his views on cadaver experiments of which he performed a number. Dissecting off the skin and the muscles

from the capsule of the humero-radial articulation, he could easily demonstrate that when the head of the radius was pulled partly out of the capsule and extreme pronation was added at the same time, the anterior part of the capsule was forced into the articular cavity by atmospheric pressure and could be held thus folded in, by quickly returning the radial head. If, now, supination were performed, the fold would disengage itself with a click. A similar mechanism occurred with the posterior portion of the capsule on extreme supination.

These experiments have been repeated in this country by Moore and by Van Santvoord, the latter of whom published the results of cadaver experiments on seventeen infants.

Nothing can be more simple than to produce the dipping-in of the capsule into the joint cavity above the radial head, when the skin and the muscles (supinator longus and extensor carpi radialis longior) have been removed over the joint. But when these are left intact, it is a much more difficult matter.

Van Santvoord did succeed in producing the folding of the capsule into the joint five times without removing the skin,—but it should be remembered that this was in the cadaver, and where the muscles have not the tonus they have during life.

When children forcibly pull on their fingers one can frequently see how the atmospheric pressure forces in the integument into the carpo-phalangeal articulation. But it is not easy to comprehend how such a deformity should persist even if we make allowance for the fact that the edge of the radial head presents a more defined margin than does a phalanx of the hand—especially when we observe on dissection that the capsule is adherent to the tissues overlying it.

The snap, too, heard in these cadaver-experiments is of a different character from that felt during examination of the injured children. It is of a softer quality, and the resistance to supination is not so well marked.

If the degree of the interposition of the capsule between the radial head and the eminence be still further exaggerated, we encounter another theory: that of the partial slipping-up of the lower margin of the orbicular ligament over the rim of the radial head. In this case the radial head is at the point of emerging from the annular ligament altogether. This is only

possible when the capsule has been partly torn. This theory was advanced as an explanation for the lesion under consideration by Duverney, Pingaud and Hutchinson. Stimson also accepts this theory as the most probable from a clinical point of view and the best in keeping with the literature of the subject.

Finally there are a number of writers who treat the whole matter with skepticism. Streubel himself, who had originated the theory of capsular interposition, abandoned it in his later essay (1861) and believed that all the so-called subluxations of the head of the radius in children were simply an ill-assorted and badly diagnosticated lot of bruises, sprains and stretchings of the ligaments, and Koenig, Bardenheuer and other recent writers follow in his footsteps.

Any one, I believe, who has seen a fair number of the cases in question will admit that they represent a perfectly unique and characteristic injury, always occurring in the same typical manner, and easily to be differentiated, on the one hand from atypical sprains and bruises, and on the other, from true, palpable dislocations.

As to the treatment nearly all the writers are agreed as to the manner of reduction. Extension of the forearm while in a semi-flexed position, combined with supination, with or without direct local pressure on the head of the radius, are the directions generally given. To this some add sudden flexion of the elbow.

In regard to the after-treatment, opinion is divided—some maintaining that none is necessary, others advising the use of a sling or a splint for several days, Malgaigne for two weeks, and Hofmokl for four weeks. The treatment by splints is generally advised in order to avoid recurrence of the displacement, which is admitted by many to be frequent.

The prognosis is generally given as excellent—the injury rectifying itself in a short time, if left unreduced. The more careful observers allow that tumefaction may follow. Cushing says it may give rise to serious trouble and to chronic arthritis; Lindemann to permanent enlargement of the elbow; and partial ankylosis is mentioned by Spear.

As may be expected of so slight a lesion, there are scarcely

any records of post-mortem examinations in these cases.

Fifield mentions two in children: in one the head of the radius was found dislocated and resting on the outer condyle, in another a portion of the capitulum of the radius was found broken. This latter appears to me to be of some interest; while the former may be ruled out, I think, as representing a true dislocation.

Dugès had one autopsy, but the result is not given. Malgaigne gives one, but this was in the adult and was also a case of complete dislocation, for the head of the radius was in front of the ulnar notch.

Loebker of Vienna operated upon five cases for trouble ensuing after injuries to the elbow in childhood, and found longitudinal fractures in two cases (through the radial head), complete luxations in the others.

Sprengel gives a case where the head of the radius was found outside the capsule in a boy six years of age after a fall. But we have no evidence that these cases were analogous to the ones under consideration.

We have, therefore, to fall back upon cadaver-experiments. And here those by Schüller appear deserving of mention, for the reason that he experimented most conscientiously upon some hundred cadavers. German surgeons ascribe to him the discovery that simple forced pronation cannot produce dislocation forwards of the radial head, and the most recent writers on our subject have not insisted that the injury under discussion was caused by pronation. He did show, however, that forced adduction at the elbow, where there is normally no adduction, frequently caused displacement of the radial head; and could even be the cause of the head slipping out of the orbicular ligament. But this was only in a few cases; in the greater number of cases forced adduction produced some epiphyseal injury to the lower end of the humerus. Moreover in order to draw the end of the radius out of the orbicular ligament, he had to support the upper end of the ulna, at the elbow joint with one hand.

Stimson was the first to advance the explanation that simple forced extension by overcoming the normal inclination of the

fore-arm outward from the elbow in children, would act as adduction.

I now turn to the cases that have come under my personal observation, of which there are one hundred. These were all treated at the Eastern Dispensary of New York City. There are nearly one hundred and thirty cases on my books. Some of these were seen during my absence by my colleagues, and have been excluded. Three cases occurred in adults, and have also been excluded. Then some cases were not well marked, so that the diagnosis rested between contusions and other injuries of the elbow joint in children, and the one under consideration. These have been likewise excluded.

The remaining number one hundred.

I believe it is essential to exclude all doubtful cases, as well as all cases occurring in adults, in order to obtain as clear a clinical picture as possible.

As to the frequency of the injury: these cases belong to a material of over ten thousand purely surgical cases seen by me in less than two years. But as many cases were sent to me for treatment from the childrens' class by the courtesy of my friend Dr. Koplik, I may say that the cases represented a material of over 33,000 patients.

The frequency, then, of our injury is one per cent. for purely surgical cases of all ages, and about one-half per cent. for children (with all ailments, but under ten years of age.)

These figures correspond with those of Hoffmann quoted above.

The average age of the children was two years and a quarter, the oldest one being nine years and the youngest only two months of age. Most authorities give the age as under six.

As regards the habit and constitution of the little patients, many were badly nourished pale and sickly children, while a great number were of robust and healthy appearance.

In some of the cases undoubted signs of rhachitis were present, to which my attention was first called by Dr. Koplik; and I regret not having commenced to notice this symptom at an earlier date, so as to enable me to make a more concise statement on this point. A tubercular constitution was not a general concomitant of the injury, as many authors have stated.

The exciting cause was generally some violent traction on the hand or fore-arm; but I could not ascertain that the hand was in pronation at the time in any one case. In about one-third of all the cases a fall was said to be the cause of the injury. But on closer inquiry I generally found that the mothers retracted this statement, when confronted with the statement that they must have lifted the child, or else they stated they had left the child under the care of others for a time, and that these had reported a fall on their return. In two cases the child sustained a fall and was picked up by one hand, the injury being attributed to the fall, instead of to the lifting. I therefor hesitate to place much reliance in the statements that a fall generally produces the injury. Quite frequently something was felt to snap or give way at the time of lifting; but this snap was generally localized at the wrist.

The symptoms were invariably the same: pronation, more or less complete, and but slight flexion at the elbow. No case was observed in supination. There was certainly no displacement to be made out at the point of the radial head. The fore-finger and thumb could be placed on either side of the head with facility in most cases, and no lateral displacement existed. Nor could any displacement downwards be detected. When reduction was made, however, with one thumb over the radial head, at the moment when the hand entered the position of supination, and the characteristic snap was felt, the jar communicated to the head of the radius was distinctly to be appreciated as a lateral one,—not as one in the longitudinal axis of the bone.

The other symptoms were those that have been described above.

In but few of the cases the click could not be felt,—in a number of others, however, the click could be repeated twice or even three times (in one case), by again executing forced pronation. In some cases the click could be more accurately described as a crunching crepitus.

The after-treatment usually consisted in the application of a simple paste-board box splint; sometimes a rectangular splint or a well-sized dextrine bandage was used; and the patients directed to keep the hand in a sling. The splint was left on

for three days, at the end of which the child was generally found cured. In the first cases where no splints were used, relapses were frequent. In about five cases, the splint had to be kept on for six days, swelling having ensued at the elbow or at the wrist, or, more generally, both. But whether or not these cases were the same in which no click was felt on attempted reduction, my notes do not say.

No case of serious trouble resulted from any of these injuries; although if left unreduced, I am not prepared to say what results might possibly ensue.

The diagnosis rests mainly upon the 'click' and the free motion after reduction, together with the pain on pressure over the radial head. Differential diagnosis lies between contusion and other sprains of the elbow and the wrist.

To what anatomical conditions shall we ascribe the injury?

Of the thirteen theories mentioned above, three appear especially deserving of notice.

First. The partial anterior displacement of the head of the radius, which cannot be wholly excluded, although exact palpitation should reveal the displacement, and although we can find no satisfactory cause for its persistence. This theory would be better supported if it could be shown, that the injury occurred mainly in children affected with rhachitis. For we know that in this disease the ligaments are relaxed and are easily stretched. We should however be cautious in admitting the ligaments to be relaxed in one joint, unless there was evidence of the existence of flail-joints in other parts of the body.

Second. The theory of interposition of the orbicular ligament between the radial head and the humerus. It does not appear to me to be so easy to produce the simple folding-in of the membranes above the radial head in the living subject, where they are united with the muscles, and are distended by the muscular tonus, and where the synovial lining is very slippery, as it is in the cadaver. The partial emerging of the head of the radius below the orbicular ligament could be possible only if the capsular ligament were torn.

In this case we should expect some ecchymosis and hæmorrhage, which, however, has never once been observed.

The third theory deserving consideration is that of some

local injury done to the head of the radius within the capsule of the joint. This theory is best substantiated by post-mortem evidence and by operations. It is vague in so far as no typical lesion of this sort has been experimentally established, except the fracture of the head. We might, however, expect partial solutions of the epiphysis at the head of the radius, when we consider that most of the children affected are under four years of age. This latter theory was advanced as early as 1839 in an editorial in the *Medico-Chirurgical Review*. And all observations on record can be easily made to harmonize with it. The lateral jerk of the biceps when the child catches at the nurses hand to save itself from falling, exerts a sudden traction on the radius, so that the epiphysis may be partly torn off and pushed to one side. After replacement the head of the radius is held in position by the muscular tonus, which causes the capitellum of the humerus to press down upon it; there is no tendency to displacement, unless the accident is repeated, which accounts for the rapid recovery after a few days on the one hand, and the frequency of recurrence during the first few days on the other hand. The absence of any appreciable displacement of the head of the radius out of the ulnar notch harmonizes (by means of this theory) with the assertions of Malgaigne and other surgeons; who state they have felt slight displacements of the radius from its normal position. The theory further accounts for the uselessness of the arm, while the displacement remains unreduced: the pain produces reflex inhibition of motions; but a greater pain, as a pinch, induces the child to move the arm. The swelling which obtains at the elbow when the injury remains unreduced is accounted for, while absence of hæmorrhage or ecchymosis is explained by the capsules remaining intact. The mechanical resistance to supination may be explained by the excentric configuration of the head of the radius: the epiphysis pushed partly to one side, impinges upon the ulna, until forced supination overcomes the resistance, and reduction is accomplished at the same time. The facts that simple pressure upon the head of the radius, without extension or supination will not reduce the dislocation,—that simple traction will not reduce it, and that it frequently becomes reduced spontaneously are accounted for.

Finally the objections made to the theory of capsular inter-

position above the head of the radius by Bourgnnet and Perrin, that there is no lowering of the radial cup below the level of the capitellum of the humerus, and the statements of Marjolin that he found slight deformity at the elbow, and of Bardenheuer, that supination and rotation do sometimes not rectify the injury, are all in accordance with this theory. And so are also those statements that sometimes the hand is retained in supination.

However well this theory may accord with the descriptions, on paper—I have not satisfied myself clinically or anatomically of its truth. I could not produce any typical injury to the head of the radius as Hofmokl describes, by attaching a weight of two pounds to the neck of the radius and letting it fall. And I cannot conceive how a partial rupture of the radial epiphysis should be prevented from becoming complete, in which case there should in my opinion be more deformity present.

I am therefore not prepared, before further study of the subject, to decide in favor of any one of the numerous theories advanced to explain the lesion under consideration.

CONCLUSIONS.

1. The injury frequently occurring in children and called subluxation of the head, or displacement by elongation, of the radius is a well-defined, typical injury with well-marked, constant symptoms, and due to the same anatomical lesion in each case.

2. The frequency is over one per cent. of surgical injuries in children.

3. It occurs in children under nine years of age.

4. The most frequent exciting cause is sudden traction by the hand or fore-arm; more rarely a fall.

5. The principal symptoms of the injury are : absence of appreciable deformity ; loss of function of the arm ; localized pain over the head of the radius on pressure ; pronation of the hand ; slight flexion of the elbow. Crepitation or snapping upon forced supination with restoration of function.

6. Treatment with a splint is advisable in order to prevent recurrence.

7. The anatomical lesion causing the injury is not yet satisfactorily established.

W. W. VAN ARSDALE.
TABLE OF CASES.

<i>Number</i>	<i>Date, 1887.</i>	<i>Years.</i>	<i>Age, Months</i>	<i>Sex.</i>	<i>Nationality of Parents.*</i>
1	June 22.	4	.....	M.	A.
2	July 12	4	.....	F.	A.
3	August 18.	1	7	M.	G.
4	August 27.	2	6	F.	R.
5	September 10.	1	6	F.	G.
6	September 10	1	.....	M.	G.
7	September 23.	2	3	F.	U. S.
8	September 28.	1	10	M.	G.
9	October 8.	1	12	M.	R.
10	October 15.	1	5	F.	R.
11	October 17.	2	.....	M.	G.
12	October 22.	1	.....	F.	R.
13	November 1	1	6	M.	R.
14	November 5.	.....	9	M.	A.
15	November 7	4	.....	M.	U. S.
16	November 11.	.....	11	F.	R.
17	November 14	2	.....	F.	R.
18	November 25	.....	10	F.	R.
19	December 7.	.....	10	F.	R.
20	December 10.	3	.....	F.	U. S.
21	December 13	2	.....	F.	R.
22	December 14	3	.....	M.	U. S.
23	December 15	.....	6	M.	R.
24	December 15.	2	9	F.	G.
25	December 27.	3	.....	F.	R.

* The children were most all born in this country, but of German, Austrian or Russian parents, to which the capitals G, A, R respectively refer.

TABLE OF CASES.—CONTINUED.

<i>Number.</i>	<i>Date, 1888.</i>	<i>Years.</i>	<i>Age. Months.</i>	<i>Sex.</i>	<i>Nationality of Parents.</i>
26	January 1.	3	....	M.	R.
27	January 10.	2	....	F.	R.
28	January 13.	4	....	M.	R.
29	January 30.	3	....	M.	G.
30	February 11.	....	3	F.	R.
31	March 7.	2	....	F.	U. S.
32	March 13.	3	....	F.	A.
33	March 23.	....	7	F.	A.
34	March 24.	1	6	F.	R.
35	April 10.	3	....	M.	R.
36	April 12.	4	6	M.	R.
37	April 18.	1	....	F.	R.
38	April 19.	1	2	F.	R.
39	April 24.	....	7	F.	R.
40	April 30.	3	....	F.	R.
41	May 2.	1	1	F.	R.
42	May 22.	2	....	F.	A.
43	May 28.	1	5	M.	A.
44	May 31.	3	....	F.	G.
45	May 31.	3	....	F.	A.
46	June 4.	1	....	F.	R.
47	June 5.	2	....	F.	A.
48	June 5.	2	6	F.	A.
49	June 12.	1	6	M.	R.
50	June 14.	2	....	F.	R.

TABLE OF CASES,—CONTINUED.

<i>Number.</i>	<i>Date, 1888.</i>	<i>Years.</i>	<i>Age, Months.</i>	<i>Sex.</i>	<i>Nationality of Parents.</i>
51	June 16.	2	....	F.	R.
52	June 18.	2	6	M.	U. S.
53	June 18.	....	9	F.	R.
54	June 23.	6	....	F.	R.
55	June 25.	3	....	F.	R.
56	June 27.	....	7	F.	R.
57	July 5.	8	6	M.	R.
58	July 7.	1	9	M.	R.
59	July 7.	5	....	F.	R.
60	August 25.	1	6	F.	A.
61	August 28.	1	4	F.	G.
62	August 31.	1	1	F.	R.
63	September 1.	1	1	F.	R.
64	September 3.	....	9	F.	R.
65	September 7.	1	6	F.	R.
66	September 8.	2	6	F.	A.
67	September 21.	4	....	M.	R.
68	September 22.	3	....	M.	R.
69	October 2.	5	....	F.	R.
70	October 2.	3	...	F.	R.
71	October 5.	1	6	F.	R.
72	October 7.	2	....	F.	A.
73	October 13.	3	....	M.	R.
74	October 16.	3	....	M.	U. S.
75	October 19.	1	1	F.	R.

TABLE OF CASES.—CONCLUDED.

<i>Number.</i>	<i>Date, 1888.</i>	<i>Years.</i>	<i>Age. Months.</i>	<i>Sex.</i>	<i>Nationality of Parents.</i>
76	October 23.	1	4	F.	A.
77	October 23.	4	....	M.	R.
78	October 30.	1	6	F.	A.
79	November 14.	4	....	F.	R.
80	November 16.	3	....	F.	A.
81	November 28.	2	....	F.	R.
82	December 10.	4	....	M.	R.
83	December 12.	3	....	F.	G.
84	December 14.	2	....	M.	R.
85	December 26. 1889.	...	2	F.	R.
86	January 3.	2	...	F.	R.
87	January 8.	2	....	M.	Egypt.
88	January 14.	3	....	F.	R.
89	January 14.	....	8	M.	R.
90	January 15.	....	7	F.	U. S.
91	January 21.	1	....	F.	R.
92	January 28.	...	9	F.	R.
93	February 3.	3	....	M.	U. S.
94	February 9.	1	10	F.	G.
95	February 10.	1	3	M.	R.
96	February 10.	1	2	M.	R.
97	February 19.	3	F.	R.
98	February 20.	2	F.	R.
99	February 23.	2	F.	R.
100	March 7.	4	F.	R.

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TWO CASES OF SPINAL SURGERY.

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NEUROLOGICAL MEMORANDA BY DR. DERCUM.

CASE I.—C. K., æt. 55 years, a cigar maker, a German by birth and a very intelligent man, gave the following history: His father had died at 56, of carcinoma of the stomach, and his mother at 39, of phthisis. He had one brother who was still living and in good health. He himself had, previous to his present disease, been perfectly well. He had never had any illness of moment. He had never drunk to excess and had never had any venereal disease. There was no history of injury or exposure.

On Christmas day of 1887 he was attacked with severe pains in the arms and shoulders. These were most marked on the insides of the arms and were burning and shooting in character. The parts became very painful on motion, but there was at no time any loss of power. Three or four days after the commencement of the attack he noticed distinct weakness of the thighs. He found that he could not raise them as readily as before. This weakness became more marked and rapidly spread down the legs to the feet and upward over the trunk as far as the breast. In the course of eight days he had become completely paralyzed. Both sphincters were involved. Hand in hand with this loss of power, numbness made its appearance and soon became profound. It involved both legs and the trunk up to the level of

the nipples. Pains had at no time been present in the legs. Anæsthesia, on the other hand, had never invaded the arms. The pain in the latter which had characterized the beginning of the affection gradually subsided and at the end of three weeks had disappeared. For three months following, no new symptoms had made their appearance. At the end of this time, however, he began to notice a constricting pain at about the level of the nipples. A little later also a small bed-sore formed over the lower portion of the sacrum. The girdle pain gradually grew more intense and caused him much suffering. His general health, too, became more and more impaired. He remained in this condition until October 1, 1888, when the following notes of his case were made:

Has complete paraplegia. All of the muscles, not only of the legs but also of the trunk as far up as the intercostals of the fourth or fifth interspace, if not higher, are paralyzed. This paralysis is absolute. The diaphragm is not involved. All of the reflexes, both deep and superficial, are much exaggerated. Ankle and patellar clonus, are not only present, but marked to an unusual degree. This also true of Sinkler's great toe reflex. The plantar and cremaster reflexes are also elicited with great ease and are unusually active. The legs are perfectly relaxed and flexible. Nothing suggestive of a spastic condition nor of contracture obtains, nor are there any clonic spasms. No marked wasting has taken place. Faradic irritability appears slightly increased.

Profound anæsthesia is found to exist everywhere over the paralyzed parts, both to touch and temperature. It ceases abruptly at the level of the second rib or slightly below it. Here a sharp line of demarcation can be made out running transversely over the chest and also over the back. It is readily traced except in the axillary region and is slightly irregular in its course. It is so sharp that a variation in the position of the pin point of but a quarter or even an eighth of an inch above or below it, determines the recognition or non-recognition of the impression by the patient. This line was also confirmed by means of a pointed faradic electrode though this gave a slightly lower level, due, doubtless, to the diffusion of the current. There is nowhere except, perhaps, in the axillæ, any shading from the sensitive into the anæsthetic areas.

A little below the level of this line the patient experiences an intense girdle pain. The position of this pain has not varied since its onset in the preceding April. It is slightly diffused, but appears to be most marked just below the third rib. It is further noted that slight blows

upon the head in the direction of the spinal axis are accompanied by a frightful exacerbation of this pain. On turning the patient on his face and gently percussing the spine, pain is elicited over the third and fourth vertebrae, and to a less extent over the fifth. Firm pressure also evokes the same symptoms. Flexion and torsion of the trunk also give rise to pain in this region.

In addition, both sphincters are paralyzed; *tæcal* evacuations take place without the patient's knowledge, and the urinal is worn constantly. A bed sore, some two by three inches in size, deep, sharply outlined and doubtless trophic, exists at the end of the sacrum.

No anæsthesia or paresis exists in the arms. A slight inequality of the pupils is noted, the left being slightly larger than its fellow.

The case as it now presented itself did not admit of an absolute diagnosis. The history of pain and paralysis suggested a myelitis, although the gradual diffusion of the paralysis from the thighs downward to the feet and upward over the trunk suggested an aberrant form of Landry's palsy. However, the symptoms elicited by transmitted and by direct blows upon the spinal column, as well as by flexion and torsion, pointed unmistakably to some localized affection of the spine or of its contents. Further, these symptoms received additional significance from the presence of the fixed girdle pain and the sharply demarcated anæsthesia.

The propriety of an exploratory operation at once suggested itself. Here we had a man who had been already some ten months in bed, who was suffering acutely and whose general condition had steadily grown worse. For him there was no hope of amelioration, much less of cure. The iodides and mercurials, had been thoroughly tried and had availed nothing. Accordingly, on October 8, I called a consultation of my colleagues, Drs. Mills, Sinkler and Lloyd. The propriety of an operation was freely discussed and unanimously concurred in. Our views were communicated to the patient, the uncertainty and danger being vividly placed before him. With little or no hesitation he consented, and at once, with philosophic equanimity, made all the necessary preparations for his demise.

Dr. J. William White was now requested to see the patient, advised the operation, and finally gave the sufferer the benefit of his skill on October 17. At my suggestion, Dr. White commenced by removing the spine and laminæ of the fifth dorsal vertebra. This, I am now convinced, was too low. The fragments of bone and the underlying tissue, including the external aspect of the dura, revealed nothing abnormal. Next, the corresponding parts of the fourth, third, second

and first dorsal vertebræ were removed. Nothing abnormal was anywhere detected except beneath the arches of the third dorsal vertebra, where the dura appeared hard and resistant. The cord, too, seemed to swell and rise up out of its bed. The significance of these features, however, was doubtful to us. Finally, it was decided to open the dura. This was done by a median incision some four inches in length. On everting the inner surface, to our great satisfaction, the dura was found to be intimately adherent to the subjacent pia by means of numerous fine bands of inflammatory tissue. Dr. White carefully separated these bands as far as accessible. The cord itself seemed normal. The wound was then closed.

The operation had occupied about an hour and a half. The patient reacted promptly. Five hours later, while still suffering from the after effects of the ether, he complained of great pain in his knees. This was a new symptom, and, as he expressed it, a reminder that he was really the possessor of a pair of knees. The pain was somewhat relieved by flexing the limbs. He also stated that the girdle pain of which he had so long and so persistently complained, had entirely disappeared.

On the following morning, October 18, he complained much of the pain in the knees and also of pain in the back and limbs. The remarkable fact was now demonstrated that there was a distinct return of sensation in the feet. He was not able, however, accurately to locate impressions, invariably fixing them much too high. Further, he presented the symptom of *allocheiria*, persistently referring every impression to the opposite limb.

On the following day, October 19, it was thought best not to disturb the patient by an examination.

On October 20 the following note was made: Up to this time the limbs have been perfectly relaxed. Now, however, the thighs are markedly adducted, and there is considerable resistance to passive movement. This, of course, is involuntary. When tested for sensation he now readily recognizes the touch of the hand, and accurately locates the impression when in the neighborhood of the right knee. There is no perceptible delay in the response in some areas and decided delay in others. The cutaneous sensibility is not, as yet, evenly distributed, and seems to have returned in patches. Further, the patient is very apt to locate the impression far too high; for instance, he describes a touch upon the ankle as having been made upon the knee, and a touch upon the toes to the middle of the foot. Sensation is best along the edges of the tibiæ, and quite poor or absent on the

outer and posterior aspects of the legs. The symptom of allocheiria is much less marked than at the previous examination, though it is still occasionally elicited. Out of four trials, for instance, he answers correctly three times, and at the fourth refers the impression to the opposite foot.

The reflexes appear to have undergone no change. On testing him with closed eyes, regarding his knowledge of the position of the limbs, he answers quite accurately, a condition not previously present. The girdle pain is still absent. The pain in the knees continues.

On October 23, on testing his sensation again, he remarked that the hand touching his feet was cold, which was true. The remark was unsolicited and entirely spontaneous. The responses of the various tests were still delayed here and there, and there was still considerable confusion in locating the impression. For instance, when a pencil point was placed on the inner aspect of the right leg he referred it to the outer aspect, and when it was placed over the middle third of the tibia he referred it to the foot. At other places, over the back of the feet, for example, the impressions were accurately located. Allocheiria was elicited now and then, but less readily than at previous examinations; thus, a touch upon the middle third of the inner aspect of the right leg was once referred to the corresponding region on the outer aspect of the left leg, and at another time a prick upon the inner aspect of the left leg was referred to the anterior tibial region of the right leg. Again when the great toe of the left foot was passively flexed, the patient claimed that it was the great toe of the right foot which had been moved. At another time when the great toe of the right foot was passively flexed the patient responded correctly.

He was now asked to concentrate his attention upon the toes of his left foot, and to make a strong effort to move them. The result was negative. He was then asked to do the same for his right foot, and it was thought by myself and the resident that an almost imperceptible movement in the toes resulted. However we were not certain.

On examining the reflexes, we discovered that upon the left side they were no longer as excessive as formerly. They had evidently undergone a diminution. Upon the right side they were unchanged.

On October 25, he distinctly moved the right great toe. In other respects there had been no marked change.

On November 1, the toes of both feet were repeatedly moved. There was also some slight improvement in sensation. The patient's general condition was also much better. On searching for the bed-sore, it was found to have completely healed, nothing but a small scar remaining.

Observations were now made from time to time, a general improvement, both as regards sensation and motion, being noted. By December he could distinctly move the feet and began to manifest some control over the muscles of the thighs, and finally became able to flex and extend both the legs and thighs to a considerable degree. Sensation also continued to increase in accuracy of location. Fewer errors were constantly being made. His improvement continued slowly but steadily throughout January of 1889. In February, hand in hand with this improvement, he had some return of pain in the chest. It was not the old girdle pain, but a new pain confined to the left side and more diffuse than the preceding, but attended by distinct tight or drawing sensations. It was less severe than before, and, he assures me, has at the present time, April 13, largely disappeared.

On being questioned regarding the sphincters he says that he is now conscious of every movement of the bowels, that he can always inform the nurse in time to keep himself from being soiled, and at times he thinks he can slightly control them. Regarding the bladder, his statements are more positive. He says that the urine no longer constantly dribbles from him, but that it accumulates in the bladder and is voided in bulk and at tolerably regular intervals; further, that he is always conscious of what is taking place, and that he always knows it beforehand and is positive that he has a number of times controlled the act. He is steadily increasing in strength. The movements of the legs, though leaving much to be desired, are evidently gaining in power, while the muscles of the trunk seem almost completely restored. He now sits up daily in a chair for three or four hours. His sensation is almost up to normal. He accurately separates the points of the æsthesiometer in all but a few areas. His responses are immediate and for the most part given with assurance.

It should also be related that the original girdle pain which disappeared so promptly after the operation never recurred, nor was it possible at any time to produce pain by transmitted shock nor by forced movements of the column.

In looking back over the case, it is undeniable that the improvement is directly due to the operative interference, whatever the lesion of the cord may have been. It is extremely probable that the evidences of internal pachymeningitis observed at the time of the operation were but secondary to some other process, and it is further probable that the operation did not extend sufficiently high. It certainly would have been well to have included the 6th and 7th cervical vertebræ, though the unanimous opinions of those present was that the

operation had been as extensive and as thorough as the strength of the patient would permit.

As it is, the return of function, especially the almost immediate return of sensation, and the immediate relief of girdle pain, point to the relief of pressure. Further, it should be stated, no attempt was made with instruments to explore the anterior aspect of the cord.

SURGICAL MEMORANDA, BY DR. WHITE.

In the case of C. K. the patient was prepared for operation by the administration of a saline purgative on the previous day, followed by an enema on the morning of operation. Five or six hours before my arrival at the hospital the skin of the upper dorsal region was washed with soap and hot water, then with alcohol, and finally with a solution of 1:20 carbolic in 1:500 bichloride, after which it was covered with cloths wet in the same solution. At the time of operation the patient was etherized in an adjoining room and was then placed upon the operating table in a semi-prone position, a small flat pillow under the sternum serving to throw out and make prominent the dorsal spinous processes. An incision beginning a short distance above the spine of the vertebra prominens was carried down for about seven inches in the median line, going directly to the bones and extending below the level of the sixth dorsal spine. The ligamentous attachments and the muscular masses occupying the vertebral gutter on the right side were then rapidly separated with the edge of the knife and the bones cleared with a curved periosteal elevator. A few large muscular branches were caught with hæmostatic forceps, and the wound was packed with sponges wrung out of hot bichloride solution. The opposite side of the spine was then treated in a similar manner. Small flat rectangular retractors with blunt serrated edges were then used to separate widely the sides of the wound, no transverse division of the deep fascia being found necessary. The spinous processes of the 4th and 5th dorsal vertebrae were then divided at their bases with powerful bone forceps, set at an obtuse angle and were removed, greatly enlarging the field of operation. With similar forceps set at a still larger angle—nearly straight—the lamellæ of the 5th dorsal were then cut through by small "bites" first on one side, then on the other, and as near as possible to the transverse processes, after which the attachments of the vertebra to the 4th and 6th were divided by the same forceps cutting transversely to the axis of the spinal column. The loose portion of bone was then seized with lion forceps and separated from its attachment on the

under surface first by a few touches of the knife and then by the use of scissors curved on the flat. This exposed the posterior surface of the dura which was quite intact, and even gave room for the gentle exploration of the lateral and antero-lateral aspects of the cord with the tip of the little finger. The spines and lamellæ of the 4th, 3d, 2nd, and 1st dorsal vertebræ were successively and easily removed in the same manner. At Dr. Dercum's request, I then picked up the dura with a pair of fine-toothed forceps, nicked it, and with scissors divided it in the median line to the full length of the incision. It was found at places, and particularly toward the upper angle of the wound, to be very adherent by new fibrous tissue to the subjacent membranes and cord and was separated with some little difficulty. Exploration with the finger, which could be passed well toward the anterior surface of the cord, revealed nothing abnormal. As enough of the cord had been exposed, in the opinion of Dr. Dercum, Dr. Mills, Dr. Lloyd, Dr. Sinkler and the other neurologists, present to cover the area supposed to be implicated, I then proceeded to close the wound. The dura was stitched by interrupted catgut sutures introduced at intervals of about one third to one quarter of an inch by means of long handled staphyloraphy needles. A medium sized rubber drainage tube was then laid in the wound, its ends projecting at each extremity. The muscles, including the deep fascia, were then brought together by chromicized catgut stitches and the skin and subcutaneous structures by silver wire. The wound was dusted with iodoform, covered with protective and then with bichloride dressings held in place by an antiseptic roller applied as a circular of the chest and a posterior figure-of-eight. There was a moderate amount of shock, but the patient soon rallied.

Surgically the subsequent course of the case was uneventful. Free oozing with escape of cerebro-spinal fluid necessitated a daily change of the dressings for several days, after which it was dressed at much longer intervals. The tube was shortened by drawing it out at the lower angle of the wound on the 5th day, and was withdrawn completely on the 10th day. There was great pain on the second day after the operation and considerable discomfort for three or four days later, referred to the back and legs.

There was almost no fever; with the exception of one day—the 11th—when it suddenly rose to 103° . It never went above 100° . On that occasion it was found to be due to obstinate constipation and fell permanently after the use of purgatives and quinine. The deep portions of the wound healed in about two weeks, but the skin edges were separated by the bad practice of some of the attendants who raised the

patient in bed, when it became necessary to wash and change him, by drawing on the arms, thus forcibly separating the scapulæ, and with them the wound. This, however, granulated promptly and nicely, and union was complete in a little more than three weeks.

There were no complications of any sort whatever and at no time, so far as the operation was concerned, was the patient's condition one that could justify anxiety.

NEUROLOGICAL MEMORANDA, BY DR. DERCUM.

CASE II.—J. G., æt. 23 years, a laborer, an Irishman by birth, gave the following history: His mother had died at middle age; cause of death unknown. His father was living, as were also his brothers and sisters. As far as he knew, they were in good health. He himself had never had any other disease than measles in childhood.

One year and four months ago he commenced to have pain across the small of the back. It was a dull ache and seemed to spread from the spine along the region of the false ribs on either side, being worse on the left. Little by little he noticed that he could not run or walk as well as before, and also when he rested his foot against a chair, as in the act of lacing his shoes, that his leg commenced to shake to and fro. If he stood for any length of time the pain in his back would grow worse and his legs would get stiff. Did not notice that they grew cold. In March, 1888, he was admitted to the Philadelphia hospital with pneumonia of the right lung. His convalescence was very prolonged. He was in bed two months, during which time he noticed frequent trembling of the limbs and on attempting to stand the vibration became excessive. These symptoms became more and more pronounced during the convalescence from the pneumonia. For about two weeks after leaving his bed he walked about the ward with the aid of a cane. At the end of this time walking was impossible. The loss of power had, however, been gradual. Finally, it became absolute and he could no longer move the legs even in bed. His last successful effort consisted in moving the toes, but this he had not accomplished for some two or three months.

At the time of the examination complete paralysis of all the muscles of the lower extremities existed. The abdominal muscles were possibly paretic but not decidedly so.

The myotatic condition was now studied. *a, Body prone.* Percussion over the trapezius, the rhomboid, the latissimus, the scapular and the quadratus muscles yielded no response. Slight responses

were elicited in the gluteus maximus and gastrocnemius of either side. Percussion of the ham strings tendons provoked faint contraction of the corresponding muscles. Percussion of the tendo achillis provoked marked contraction of gastrocnemius. Percussion of the plantar fascia elicited flexion of all the toes, more marked in the right foot. The responses, as a rule, were more marked on the right side.

At the level of the twelfth dorsal vertebra and below it, superficial reflexes could readily be evoked; not, however, in the lumbar muscles. In all of the muscles, too, of the buttocks, back of thighs and back of legs most extensive reflexes could be evoked by stroking the overlying or neighboring skin.

On attempting gradual flexion of the leg upon the thigh a slight resistance was experienced. Rapid flexion elicited a faint clonus of the gluteal and ham-string muscles. In the right leg these features were more marked.

The following curious reflex was also developed. The patient, it should be remembered, was still lying prone. If now the foot was rapidly extended and then released, the leg would at once be flexed upon the thigh. This phenomenon resembled Sinkler's toe reflex in character, but the movement was altogether different. The toes were not grasped by the hand, simply the metatarsus and tarsus, and, moreover, the quadriceps extensor took no part in the response. It was more marked on the right side.

b. Bodysupine. Percussion of the pectorals elicited a slight, normal response. The recti responded very vigorously, especially the middle and lower portions. The quadriceps yielded vigorous responses on both sides. The adductors of the thighs yielded a slight response, while the extensor group of either leg yielded a very decided response.

Knee jerk and ankle clonus both very excessive. Sinkler's toe reflex very marked.

No response to stroking the skin over the pectorals. Very vigorous response on stroking the skin over the abdominal muscles and the extensors of the thighs. Cremaster reflex also elicited, but not excessive.

There was never any paralysis of the sphincters. Bladder and rectum were under perfect control.

Cutaneous sensibility was comparatively well preserved. The responses were prompt in all portions of the trunk. Over the inner aspects of the thighs and of both the inner and outer aspects of the legs the responses were slightly delayed. Separation of the points a little below normal in the legs and feet, more marked toward the feet. On

the feet, too, the patient makes frequent errors of location. However, nowhere can actual anæsthesia be demonstrated.

It remains further to state that a slight prominence existed over the region of the 10th and 11th dorsal vertebræ. Tubercular disease was suspected. Dr. John Musser, under whose care the patient had been, informed me that no elevation of temperature had occurred for several weeks past. Syphilis was denied. Dr. J. Wm. White likewise saw this patient and concurred in the propriety of an operation. To this patient submitted on December 12, 1888. The 9th, 10th and 11th dorsal spines and arches were removed. The dura was not touched.

Though the surgical interference was much less extensive than in the preceding case the patient died thirty hours after the operation.

AUTOPSY.—Eighteen hours after death general appearance, that of a man of fine physical development. Muscles large, chest well shaped. Not much superficial fat.

Thorax.—Visceral and parietal pleura united by numerous bands of old adhesions, most extensive on right side. Patch of softened tissue, size of egg, in posterior portion of lower lobe of right lung. Pleura especially adherent at this point. Minute tubercles scattered through both lungs. Bronchial glands caseous.

Pericardium normal. Heart muscle pale and soft; valves normal.

Abdomen.—Nothing worthy of note, except amyloid changes in both kidneys.

Spinal Column.—Both thoracic and abdominal viscera having been removed, extensive tubercular disease of both dorsal and lumbar vertebræ was noted. On the right side in the thoracic region was observed a tuberculous mass which had evidently been adherent to the patch of softened lung tissue noted above.

Cadaver prone: Surgical wound reopened; aspect of wound healthy. No effusion of serum or blood. Dura unchanged. Spinal canal now opened to full extent. Dura and peri-dural tissues everywhere normal. Dura opened entire length. Cerebro-spinal fluid normal in color and quantity. Appearance of cord, normal, except at level of 11th dorsal vertebra. Here it is undoubtedly soft. Above and below the consistence of the cord does not appear to have changed. Immediately above the site of operation a minute extravasation of blood is noted. Cauda equina healthy.

A section of cord one inch in depth was now removed, the upper portion of the section corresponding to the area of softening.

Cranium unopened.

Microscopical Examination of Cord.—This proved to be exceedingly interesting, especially in view of the conclusions of many surgeons and neurologists recently formulated by Elliott, who argues against the occurrence, at least the frequent occurrence of inflammation of the cord as a result of compression in Pott's disease.¹ In the first place the cord shows no alteration in shape, nor does there appear to be any change in the pia mater. A very striking change, however, exists in the gray matter. Here extensive hæmorrhagic infiltration has taken place. It is marked on both sides, but especially so on the left; nor is it absolutely confined to the gray matter; here and there the white matter has been invaded. It is of interest to note that



FIG. 1.—TRANSECTION OF LUMBAR CORD, SHOWING HÆMORRHAGIC INFARCT.
(Drawn by Allen J. Smith).

this condition is relatively recent. The stage is still that of *red* softening, and little, if any, change has taken place in the blood-corpuscles. If we seek for indications of long standing and chronic inflammatory changes we fail to find them. In the cornua of the gray matter, the nerve cells are quite well preserved; the nerve tubules of the white matter likewise present a normal appearance, and we do not find any noticeable increase in the neuroglia. Further it is most marked in sections made from the upper portion of the fragment, namely, that which had undergone most compression.

It is not at all improbable that the long continued and unavoidable administration of the anæsthetic played a part

¹See New York Med. Journal, June 2, 1888, p. 589. The Pressure Paralysis of Pott's Disease, by Geo. R. Elliott.

in bringing about a fatal termination of the case. The pathological findings in the case point to an earlier operation. Had the operation in the present case been undertaken but a few weeks earlier it is doubtful whether the cord would have presented any pathological changes whatever. These considerations, it seems to us, are very important, affecting as they do the possibility of recovery from the paraplegia.

Had it been possible to determine in advance the extensive tubercular degeneration of the vertebræ, it would no doubt have weighed against the advisability of the operation. However, the absence of changes in temperature, the well-nourished and apparently good condition of the man decided the question in the affirmative. Further, though the vertebral disease was extensive, the amount of deformity was very slight.

Surgical Memoranda, by Dr. White.—It is not necessary to repeat in this case the details of the operative procedure which were precisely the same as in the previous one. The result was a surprise and great disappointment to me. So much less interference with both bony and nervous structures had occurred; the patient was so much younger; his general appearance was so good and his nutrition so excellent that my prognosis, based also on the reports of the attending physicians and neurologists, was very favorable, as regarded the immediate effects of the operation. The autopsy, of course, disclosed a hopeless condition, or rather series of conditions, that went far both to explain the fatal result, and to render it less distressing, as the case was evidently a hopeless one. Either the spinal abscess or the pulmonary tubercle would have strongly contraindicated operation had their existence been revealed by persistent fever or sweats, by cough or emaciation, or by physical signs. In the absence, however, of these, and of all other significant symptoms, and in the presence of a spinal deformity which seemed to point strongly to a pressure paraplegia, the operation seemed justifiable.

The immediate cause of death, I am disposed to believe, was a combination of shock with the free use of ether in a patient with crippled lung power, a degenerated heart muscle and amyloid kidneys. There was no hæmorrhage of any moment, and indeed, the quantity of ether administered was not exces-

sive as compared with that used in every-day operations on ordinary patients.

The chief lessons of the case are: 1. The apparently unavoidable risk due to insidious and unrecognizable complications, a risk which is probably greatly increased in tuberculous patients. 2. The existence of red softening in a case of Pott's paralysis, a condition which, if we can judge by recorded autopsies and by the expressed opinion of many competent observers is more or less exceptional. 3. The necessity for extreme caution in the use of anæsthetics in all cases in which the existing and recognized disease makes coincident visceral changes probable, or even possible.

I append the notes of my resident, Dr. Dalley, and desire to call especial attention to the remarkable difference in temperature between the mouth, the surface and the rectum.

CLINICAL NOTES.

1 P.M. Patient complained of being cold; ordered blankets, hot cans and whisky \mathfrak{Z} ss, ammon. carb. gr. v, hot water \mathfrak{Z} j every half hour.

1:15. Temperature, 97.1° (rectum); pulse, —; respiration, 32; vomited matter of a dark brown color; whisky \mathfrak{M} xx, tr. digitalis \mathfrak{M} x, hypodermically.

1:30. Whisky \mathfrak{Z} ss, ammon. carb. gr. v, given hot. Patient covered with cold perspiration; dressing slightly soiled with blood; complains of pain in heel.

2:00. Whisky \mathfrak{Z} ss and ammon. carb. gr. v., hot. Complains of great pain in heel.

2:15. Temperature, 97.1°; pulse, 138; respiration, 36. Soiled dressings show some oozing from wound. Feet quite warm and are losing their blue color.

2:30. Whisky \mathfrak{Z} ss, ammon. carb. gr. v, hot. The pain has extended to the calf of leg. Also complains of stinging pain on inside of legs.

3:00. Whisky \mathfrak{Z} ss, ammon. carb. gr. v.

3:15. Temperature, 97.2°; pulse, 136; respiration, 34. Pain in knee is complained of.

4:30. Whisky \mathfrak{Z} ss, ammon. carb. gr. v. Patient vomiting.

4:45. Whisky \mathfrak{Z} ij, ammon. carb. gr. ijss, every fifteen minutes. Vomited.

5:00. Whisky \mathfrak{M} xxv, tr. digitalis \mathfrak{M} v, hypodermically.

5:30. Temperature—rectum, 102°; mouth, 95.3°; axilla, 98°. Whisky and ammon. carb.

5:45. Whisky and ammon. carb. Patient still vomiting.

6:00. Temperature—rectum, 102.8°; mouth, 94°; axilla, 99°.

7:00. Temperature (rectum), 99.4°. Still vomiting.

8:00. Temperature—rectum, 100.3°; axilla, 99.1°; surface (calf), 95.2°; chest, 97.3°.

9:00. Temperature—rectum, 101.3°; axilla, 98.2°; surface (chest), 97°; pulse, 82, feeble; respiration, 36. Repeated vomiting.

10:00. Temperature—rectum, 101°; axilla, 99.4°; mouth, 95°; surface, 97.3°; pulse, 100; respiration, 34. Still vomiting and complains of great thirst. Hypodermic injection of whisky and digitalis. Catheterized at 10:30, and about 33 urine drawn off.

11:00. Temperature—rectum, 101.4°; axilla, 100°; mouth, 95°; surface, 97.3°; respiration, 36. Still vomiting. Slept twenty minutes.

12:00. Temperature—rectum, 104°, axilla, 99.2°; mouth, 94°; surface, 95.3; respiration, 34. Whisky and ammon. carb. by mouth, followed by vomiting. Hypodermically, whisky and digitalis. Complained of pain in leg.

1 A.M. Temperature—rectum, 103.4°; axilla, 100.1°; mouth, 94°; surface, 96.3°; pulse, 98; respiration, 33. Vomiting brown fluid. Cocaine gr. $\frac{1}{2}$, followed by wine 5ij, which was immediately vomited. Patient perspiring. Slept fifteen minutes.

2:00. Temperature—rectum, 103.2°; axilla, 99.2°; mouth, 94°; surface, 96°; respiration, 38. Still vomiting. Cocaine gr. $\frac{1}{2}$, followed by ammon. carb. gr. v, which was retained. Slept fifteen minutes.

3:00. Temperature—rectum, 101.4°; axilla, 100.1°, mouth, 94°; surface, 95.4°; pulse, 116; respiration, 37. Cocaine gr. $\frac{1}{2}$, followed by ammon. carb. gr. v. Slept fifteen minutes. Warm milk 3ss vomited.

4:00. Temperature—rectum, 103.4°; axilla, 98.3°; mouth, 94°; surface, 95.4°; respiration, 40. Cocaine, gr. $\frac{1}{2}$, followed by ammon. carb. gr. v, which was retained.

5:00. Temperature—rectum, 103.4°; axilla, 101.2°; mouth, 94°; surface, 95°; pulse, 80; respiration, 37. Ears cold. Slept thirty minutes. Vomited.

6:25. Temperature—rectum, 101.1°; axilla, 98.2°; mouth, 94°; surface, 94.6°; respiration, 34. Ammon. carb. gr. v, vomited. Color of vomited matter dark brown.

7:25. Temperature—rectum, 101.4°; axilla, 100°; mouth, 64°; surface (chest), 95.2°; (thigh), 96°. Still vomiting.

8:45. Temperature—rectum, 102°; axilla, 100.1°; mouth, 95.1°; surface, chest 95.1°, thigh, 95.4°.

10:00. Temperature—rectum, 103.4°; axilla, 100°; mouth, 95°; surface, 97.1°; pulse, 80; respiration, 38. Vomiting frequently.

11:00. Temperature—rectum, 104°; axilla, 100.2°; mouth, 94.4°; surface, leg, 94°, abdomen, 97.3. Hypodermic injection, whisky and digitalis.

12:40 P.M. Enema. Whisky 3ss, peptonized milk 3ij.

12:50. Hypodermic injection, whisky ℥xxv, digitalis ℥v.

1:35. Hypodermically, whisky and digitalis.

1:45. Temperature—rectum, 104°; axilla, 101.4°; mouth, 94°; surface, leg, 99.1°, abdomen, 99.1°.

1:55. Mustard plaster to epigastrium.

2:30. Hypodermic injection of whisky and digitalis.

2:45. Plaster removed. Vomiting relieved. Enema. Peptonized milk and whisky.

2:50. Slept ten minutes. No nausea. Respiration 40 while asleep.

3:15. Vomited.

3:45. Temperature—rectum, 104.3°; axilla, 102.1°; mouth, 95°.

4:25. Hypodermic injection of whisky ℥xxv, digitalis ℥v, atropia gr. $\frac{1}{100}$.

5:45. Face dry; forehead and neck warm, cheeks and chin still cold; tongue moist; very restless; severe dyspnœa; pupils moderately dilated. Hypodermically, whisky, digitalis and atropia gr. $\frac{1}{100}$. While under observation dyspnœa became more intense and patient died at 6 P.M.

EDITORIAL ARTICLES.

IS RESECTION OF THE KNEE-JOINT JUSTIFIABLE IN CHILDREN?

Ever since Prof. Humphreys called attention to the fact that progressive relative shortening of the diseased limb almost invariably followed resection of the knee-joint in growing individuals, the attention of practical surgeons has been directed to this question, and more or less objection has been urged, based upon these observations against the performance of the operation in children. The now well established fact, however, that disease of the knee-joint itself is responsible for shortening in this class of cases, has been brought forward as an argument in favor of interference; for it may be said, with justice, that if shortening is to be apprehended in any event, it may as well follow an attempt to rid the little sufferer of its painful malady, as occur as a sequel to the unrestricted course of the disease.

Prior to the discovery of the bacillus tuberculosis by Koch, the theory was held as originally advanced by Robert, of Giesen, that circulatory disturbances, and particularly compression of the popliteal artery, formed a prominent factor in the causation of diminution of growth of the diseased limb in knee-joint disease. The demonstration of the presence of Koch's bacillus in the epiphyseal cartilages cast new light upon this class of cases, and led to a further study of their etiology. The interesting question, as to whether the progressive relative shortening resulting from tuberculosis of bone, and which pursues an unrestricted course, is not as important for our consideration as that following resection, now presents itself. If this can be answered in the affirmative, the only argument against resection of the knee-joint in children, will have been effectively disposed of.

As bearing upon this question, the recent study of a series of sixty-

three cases by F. Hitzegrad, of Kiel¹, is of exceeding interest. These patients were examined after a period averaging five and one-half years following the operation, with a view of determining the amount of shortening present. Although but one examination was made, and therefore this study cannot be of as great value as if repeated examinations had been made during the five years, yet it is very suggestive in its results.

Eighteen cases in children from 1 to 10 years of age at the time of operation, showed ten to have a shortening, at the time of examination, of from one to five cm.; four of them from six to ten cm., while the remaining four exhibited a deficiency amounting from eleven to sixteen cm. Nineteen cases were in individuals eleven to seventeen years of age, and of these six showed a diminution of growth resulting in from one to five cm. shortening; thirteen had from six to ten cm. Of eleven patients above 18 years of age, nine had shortening of from one to five cm. and the remaining two from six to ten cm. It would appear from this that no period of life short of that which marks the completion of the growth of the individual can be selected as absolutely favorable for resection; although, it is reasonable to deduce, and logical to conclude, that the nearer one approaches to the adult, the less will be the difference in the length of the two limbs when growth ceases, other things being equal.

The point at which the section of the bone is made has heretofore entered largely into this question, and been supposed to govern, to a great extent, the prognosis as to functional disturbance to be anticipated in any given case. Referring again to the report of cases contributed by Hitzegrad, it is found that shortening of from one to five cm. existed in sixteen cases which had been subjected to intra-epiphyseal section, while in only two instances was this amount of shortening to be found in extra-epiphyseal section. Shortening of from six to ten cm. is recorded as having followed intra-epiphyseal section in seven cases, while the same amount of shortening occurred in six cases

¹*Welcher Art sind die Enderfolge der Kniegelenksresektionen seit Einführung der antiseptischen Wundbehandlung und der künstlichen Blutleer.* Mittheilung aus der chirug. Klinik zu Kiel; herausgegeben von F. V. Esmarch.

in which the resection was extra-epiphyseal. In five cases of extra-epiphyseal section the shortening amounted to from eleven to sixteen cm.; in only a single case did the shortening reach this extent in intra-epiphyseal resection.

The seemingly contradictory nature of these figures is only to be cleared up when the fact that Hitzegrad failed to take into account the amount of shortening present, and which resulted from the disease itself, at the time of the operation, is considered. It is to be noted, where the shortening was the least, as in the first eighteen cases, the greater number of cases of shortening occurred in those in which the epiphysis was not spared, while those in which the latter was not destroyed showed the advantage of this procedure, by giving a much smaller number of cases with a like amount of shortening. But in those instances in which shortening from six to ten cm. in extent occurred, the cases are found to be divided about equally between those in which the epiphysis was preserved, and those in which it was removed. Again, it will be observed that when extensive shortening was noted, upon only one occasion did this fall within the limits of from eleven to sixteen cm., following an intra-epiphyseal; resection on the other hand, this amount of shorting resulted five times after extra-epiphyseal section.

The failure of this observer to note, first, the amount of shortening existing at the time of the operation, and which was due to the destructive effect of the tuberculous disease upon the epiphyseal cartilages; and, second, the rapidly or otherwise progressive comparative shortening, which could only be determined by several examinations extending over the period during which the progressively relative lessening of the length continued, brings us at once to a consideration of these important points as they occur in the natural history of cases of tuberculous arthritis in children which pursue a course uninfluenced by treatment.

This question has been most carefully studied by Julius Dollinger, of Budapest.¹ Basing his observations upon examinations made at dif-

¹*Das Zurückbleiben im Wachstume der kranken Extremität bei tuberkulöser Kniegelenksentzündung. Ein Beitrag zur Berechtigungsfrage der Kniegelenkresektion im Kindesalter. Centralblatt für Chirurgie, No. 49, 897, 1888.*

ferent times upon forty-one cases of tuberculosis of the knee-joint in children, he endeavors to answer the following queries:

1. At what period of time in a given case in which the inflammation is undisturbed by treatment, does relative shortening of the limb commence?
2. How great is this relative shortening after a certain number of years?
3. Does the relative shortening continue to increase after the arrest of the inflammation?
4. Is the growth of the diseased limb influenced by extension and use of the same?

Measurements of the diseased limbs were made as follows: The point of the trochanter was selected as one point of measurement in the case of the thigh, and the lower edge of the external condyle as the other. Those for the tibia were the upper edge of the tibia and the summit of the external malleolus. In order to meet the requirements necessary for question 4, measurements were made, in some instances, at different stages of the treatment by extension.

Several important facts have been brought to light by these observations of Dollinger. In the first place, it was shown that no period of time can be reliably stated in which the comparative shortening of the limb can be expected to begin. On the other hand, it is shown that as long as the active inflammation, or even hyperæmia lasts, just so long will the limb maintain its proper relation, as to length, with its fellow. In some instances, though this was found to be a rare occurrence, the diseased limb was found to undergo a more rapid growth, and become actually lengthened relatively to the extent of 1 to 1.5 cm. When the inflammatory irritation, however, comes to a standstill, or even ceases altogether, and when cicatricial contraction of the periarticular structures occurs, a greater or lesser number of the blood vessels in the neighborhood of the joint become obliterated, and the epiphyseal cartilage is insufficiently supplied with blood—then it is that the relative length of the diseased limb becomes diminished from arrested or retarded growth. The rationale of this may be readily understood when it is remembered that the normal growth of the

lower extremity depends mainly upon the epiphyseal cartilages in the neighborhood of the knee-joint.

The question as to the relative amount of shortening¹ which is to be anticipated as occurring after the lapse of a certain time, cannot be answered by any hard and fast rule, or mathematical computation. That the difference in the length of the limb is not always in direct proportion to the number of years which has elapsed since the beginning of the inflammatory disturbance, can be stated, however, as a fact. The final results must necessarily depend, among other varying influences, upon the intensity of the inflammation, and the destructive influences of the same upon the nourishing apparatus of the epiphyseal cartilage.

The question as to whether or not the growth of the diseased limb is influenced by combined extension and use of the same is of exceedingly great interest to the practical surgeon. Inasmuch as it has been claimed that these measures of treatment are useful in so maintaining the nourishment of the extremity as to lessen decidedly the comparative amount of shortening of the diseased limb. Dollinger shows, and I believe this will be found to be in accord with the experience of most surgeons, although it is difficult to gather information upon this point, so far as his observations go, that in no instance was it demonstrated that differences existing at the time of the commencement of the treatment ever lessened. In some cases the relative shortening increased, although, as a rule, it remained stationary.

Taking these facts into consideration, the question of the justifiability of performing the operation of resection of the knee-joint in children can, in my opinion, be answered in the affirmative. It has been shown by Schüller¹ that tubercular inflammation of joints is characterized by the invasion and growth of the tubercle in the interior of the joint, and that this either has its origin in a tuberculous centre in the articular extremities of the bone, or proceeds primarily from the synovial membrane. This latter method of invasion, according to this writer, is the less frequent of the two, the proportion, in the case of the knee joint, being about two to one in favor of bone. The peculiarities

¹*Die Pathologie und Therapie der Gelenkentzündungen.* Von Prof. Dr. Max Schüller in Berlin. Wien und Leipzig, 1887.

which characterise tuberculous inflammation in general are present in tubercular joint inflammation. These are, a chronically inflamed new tissue formation in the spongy and synovial tissues, which becomes infiltrated with tubercle; disintegration of existing normal tissue and tendency toward cheesy degeneration; infinite propagation of the tubercular inflammation in the surrounding and neighboring tissues from the original centre, and the occurrence, sooner or later, of constitutional symptoms, through the tubercular diathesis. In other words, we have to deal, in these cases, with what must be essentially looked upon as a form of disease progressive in its character, and which may, at any period of its existence, become as destructive to the individual as its prototype, carcinoma. The slow development of the disease, as a rule, seems to allay fears as to its serious character, until a sudden or acute accession of joint inflammation following a breaking through into the cavity of the articulation of a tuberculous centre, or a cheesy degeneration of tubercular centres within the synovial membrane, serve to awaken alarm, and lead to the instituting of more decided measures of relief. Prior to the occurrence of these, there may be no visible changes in or about the knee, and, save only some indefinite pain and a vague sense of uneasiness of the limb, or disturbance of function, there may be nothing to call attention to the joint. In the course of time, however, sometimes occupying months or even years, in a large proportion of cases, graver symptoms develop, and the question of operative interference, if it has not already occupied the surgeon's mind, is forced upon him. The importance of thoroughly eradicating the disease must be apparent, as well as the necessity, in order to accomplish this, of removing the joint surfaces *in toto*.

Extra-epiphyseal resection will be required in those instances in which the tuberculous deposit is found to extend to or above this line. It goes without saying that resection to this extent in cases in which this structure has not been invaded will certainly entail upon the patient, as a result of the operation, a disability proportionate to the extent which the diseased limb will have fallen behind its fellow when the individual has attained his full development. On the other hand, in those cases of resection for tuberculous disease of the knee joint, in

which the plates of epiphyseal cartilage can be preserved, shortening likewise occurs ; this latter resulting, not from the operation, but from the damage which the tuberculous process in the neighborhood of the epiphysis has inflicted upon the latter by interfering with its proper blood supply.

To sum up, therefore :

First. Observation and clinical experience show that tuberculous inflammation within or in the neighborhood of the knee joint, in children, leads to relative shortening of the limb, through interference with the blood supply to the epiphyseal cartilages.

Second. The amount of shortening of the limb present, when the patient reaches his full growth, will depend upon the extent to which the epiphyseal cartilages have been damaged and its bone-forming function destroyed by the presence of the tuberculous disease.

Third. Resection of the knee-joint in growing individuals is followed by relative shortening of the limb only in proportion as the line of the epiphysis has been invaded by the disease. The extent of the disease is the only guide for the surgeon to follow in determining the amount of tissue to be removed. Those cases in which the epiphysis is spared, and in which the ultimate relative shortening is found to be considerable, are cases in which the damaging effects of the disease are responsible for the functional disability, and not the operation.

Fourth. Resection of the knee-joint in children is justifiable. Attempts to preserve the epiphyseal cartilages where the latter are actually invaded by the tuberculous process can hold out no hope of lessening the ultimate relative shortening, and will almost certainly lead to a recurrence of the disease and the necessity for final amputation.

GEORGE R. FOWLER.

THE TREATMENT OF GANGRENOUS HERNIA AND ARTIFICIAL ANUS¹

This question of the treatment of the intestine in a gangrenous her-

¹A Comparison of Old and New Methods in the Treatment of Gangrenous Hernia and Artificial Anus. By Dr. W. KORTE (Berlin).—*Deutsche Med. Wochenschrift*, No. 41, 1888.

nia has not yet been settled. Primary resection and suture of the intestine has been proposed, abandoned and taken up anew; but many surgeons still prefer forming an artificial anus.

For the cure of artificial anus two methods are employed, secondary resection and suture of the intestine, and the old method of treatment, according to Dupuytren and Dieffenbach, known as the treatment by clamp. The author has collected, from various sources, 111 cases of artificial anus treated by the enterotome, with 11 deaths, 4 of which were due to intercurrent diseases.

There is yet another set of cases reported where the perviousness of the intestine was not restored, although treated by the clamp, and where secondary resection and suture of the intestine was resorted to. All these cases prove that the treatment by the enterotome is not very dangerous, but that it does not give a good result in every case.

The result of the 111 tabulated cases requires further consideration; under care it is understood that the perviousness of the gut was restored and the fæces were passed per anum. In 30 cases fistulæ remained, and either the patients were satisfied with the result or the surgeons did not dare to attempt any further operation. Of the 11 deaths 5 were due directly to the clamp treatment; 4 patients died from peritonitis and 1 from pyæmia. One patient died of marasmus and 5 from intercurrent diseases at a more or less advanced period of treatment. Dupuytren's method, owing to its long duration, the disturbances of nutrition, soiling of the wound by fæces, render the patients an easier prey to intercurrent diseases than the quick methods of cure. Most of the 111 tabulated cases were treated in the preantiseptic days.

The enterotome in itself is not a dangerous proceeding, but only in this wise must one judge of Dupuytren's method.

If a parallel is to be drawn between the clamp treatment and primary resection and suture of the intestine, it is necessary to consider all causes of deaths, and not to count only those cases who have escaped the dangers attending the formation of an artificial anus, and then cured of this condition by the use of the enterotome and the subsequent closure of the fistula, but also those cases must be considered

which died before, either as a result of exhaustion, peritonitis, phlegmon of the abdominal wall or inanition.

Both operations have their special dangers; those of primary resection and suture are shock from the serious and prolonged operation, infection of the abdominal cavity either from a poorly applied suture or from the gangrenous gut; while in the formation of an artificial anus, when the primary dangers are passed, we have those resulting from the present condition, namely phlegmon of the abdominal walls and disturbances of nutrition, before the real, and in itself, not very dangerous, treatment by clamp can be begun.

Of 28 cases of gangrenous hernia, collected in Bethonien Hospital and treated by the formation of an artificial anus, 10 died shortly after the operation, either from collapse or peritonitis; of the 18 remaining patients 6 more died from the following causes: 3 from infection of the wound, 2 from intercurrent diseases and 1 of inanition. This gives a death rate of 16 in 28 cases, or 57 per cent. According to Riegel and Henel, the death rate after any form of treatment of the gangrenous gut ranges from 52 to 54.2 per cent. Hahn states that taking everything into consideration the results are better in primary resection and suture of the intestine than in attempting to form an artificial anus, and its subsequent treatment.

According to Schmidt, death after herniotomy with resection of gangrenous gut occurs in 71 per cent of cases, whereas after attempting to form an artificial anus it occurs in 85.5 per cent of cases.

The closure of the artificial anus by secondary resection and suture of the intestine gives a death rate of 37.8 per cent, while the treatment by the enterotome and the subsequent plastic operations gives a mortality ranging from 5.1 to 9.9 per cent.

What form of treatment of the gangrenous gut offers the best chance for the patient? According to Schmidt and Hahn, there is a slight balance in favor of primary resection and suture.

F. C. HUSSON.

THE DANGERS AND EFFICIENCY OF THE MODERN TREATMENT OF WOUNDS.¹

If the term antiseptic surgery applied to the time when the Lister methods first saw the light, it can scarcely be scientific to speak of antiseptics in the treatment of wounds at the present day. If foul sloughing or decomposing suppurations were common enough, in the past, it is certainly rare to meet such wounds in the surgery of to-day. Much more in accordance with our knowledge, would it be to speak of the antimycotic action of certain drugs and methods of wound procedure, or the antimycotic rather than the antiseptic surgery. We seek to-day rather to inhibit suppuration than prevent decomposition.

All our solutions and agents were directed towards the above end. We try now to see how we can best approach the conditions favoring the minimum amount of suppuration. The great diversity existing in the methods of various surgeons in the treatment of wound, the one preferring carbolic acid, the other sublimate, another turpentine, simply proves the instability of our principles in this regard. Nothing is so great a reproach to modern surgery as this diversity of treatment. Yet it illustrates forcibly an active search after some true, quick, uniform method. If we study the effect of sublimate, carbolic acid, iodoform, salicylic acid and other antimycotic agents upon the animal cell, they are found to compromise the integrity of the cell irreparably at a point where micro-organisms are still capable of living. In other words, whatever the composition of an *antimycotic* agent it is, and must necessarily be, a poison to the economy, and any such agent introduced into the human economy in concentration sufficient to kill the vegetable micrococcus of suppuration must first affect the more delicate susceptible cells of the human organism. We have only to

¹Ueber die Gefahren und die Leistungsfähigkeit der modernen Wundbehandlung. Von Dr. EMIL SENGER (Crefeld). Berliner Klinik, heft 6, Berlin, 1888.

turn to our literature to find that some of our modern antimycotic agents (sublimite or iodoform), are directly responsible for death in certain cases. The changes found post-mortem in these cases affect most markedly the digestive tract and the kidney. (Glomerulo-Nephritis).

If we simply consider some of the antimycotic methods, or antiseptic methods, as they are called, in vogue in the leading clinics, as that of von Bergmann (*Annals of Surgery*, 1888), we can easily believe that not only slight intoxications escape the notice of clinicians, but that many patients to-day become victims of our treatment of wound. But the dangers incurred in the use of our antimycotic agents are greater if the patient come to the operation with parenchymatous disease of the organs. To illustrate, we may cite the experience of James Israel who would in the future prefer simple salt solution to sublimate in irrigating a wound after nephrectomy, this author having had a fatal case where sublimate was used. It is certainly a proof of the unscientific nature of our methods of to-day. In an amputation where we have comparatively little suppuration, strong antimycotic agents, carbolic (1 in 20), should be used, whereas in purulent peritonitis or in irrigating the serous cavities we are apt in suppurating disease to use an agent of very weak power, and purely inert in the presence of the micro-organisms of suppuration. Among the latter agents we have salicylic acid 1-5000, boric acid solution 2% or 4%, or the method of von Bergmann who simply touches the surface with a swab of sublimate, 1-2000, or places a strip of iodoform gauze 1 metre long in the pleural cavity or abdomen to keep the wound aseptic, as it is called, free from suppuration and infection. Do those means really attain this object? Actual experiment speaks to the contrary. Boric acid, according to Senger, does not affect the staphylococcus pyogenes aureus, even after an exposure of five days, and salicylic acid kills this micro-organism in the strength of 1-1000 after 6 minutes. In those situations (pleura, peritoneum, etc.) where these weak solutions are used, the strong solutions and antimycotics bring the great dangers of degeneration with fatal issue stronger into the foreground. Though bacterial experiments have their scientific interest, the test tube and culture medium is not so satisfactory a substitute for

the human economy as we might wish. The results obtained thus far in this respect are impractical. It is certainly of little use to apply to any fresh incised wound an antimycotic agent with a view of preventing suppuration, especially if, as we know, these agents perform their work imperfectly. It will be much more satisfactory if in the future we employ for our simple incised wounds (no pus being present) simply salt solution, according to the method of Landau in his myotomies. In suppurating wounds we could employ our antimycotic agent, *but* in diminished quantities to that at present in vogue. The author (Senger) sees very little future to the endeavors of Laplace and Garré to obtain an agent which will prevent the coagulation of albumen and penetrate deeply into the surrounding tissue (Acetic acid, sublimate). Much more preferable would it be to obtain or discover an agent which, as an antimycotic, would act locally. In this we could hope to eliminate dangerous or fatal intoxications from our surgery. We must study more closely the problem laid down some time since by Virchow in his article upon the strife between cell and micro-organism. In incised clean wounds, then, we should use sterilized water or salt solution, whenever we must still use the antimycotic agent in foul decomposing processes. In simple pure suppurations we may use our antimycotic, but in quantities limited according to the nature of the wound and the known dangers of fatal degenerations.

HENRY KOPLIK.

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. On Fatty Embolism. By Professor WILHELM TH. GRUBE (Kharkov, Russia). The author states that : 1. Fatty embolus may occur even as late as a fortnight after a traumatic injury. 2. Its sources are constituted not only by fractured bones, but also by crushed soft parts. 3. Hence, in all cases of extensive injuries to bones and soft parts the patient's urine should be examined several times daily for at least 3 weeks after the accident. 4. In diagnostic regards, difficulty in breathing and fall of the temperature are especially important. The former is sometimes characterized by a series of sudden loud sneezings. 5. Excretion of fat through the kidneys is intermittent. Hence, examinations of the urine may sometimes give negative results. 6. A diminution of fat in the patient's urine and a simultaneous increase of difficulty in his breathing point to growing danger. 7. To prevent fatty embolism, the injured limb must be kept in absolute rest (no massage, etc.). Any local cavities containing blood and fat should be incised into and emptied. 8. Once developed, the embolism should be treated by cardiac tonics and diuretics (the latter are to be used in order to promote the excretion of fat through the kidneys).—*Vratch*, No. 3, 1889.

II. On Pathogenesis of Senile Gangrene. By Dr. ALEXANDER G. KULABKO-KORETZKY (St. Petersburg, Russia). Basing his view on some clinical and microscopical researches of his own, the writer puts forward the following postulates : 1. The so-called "Senile Gangrene" may occur not only during an old age, but also during earlier life. 2. While remote cases of the disease greatly vary, its immediate cause consists in a disturbed nutrition of the

limb. 3. The disturbance is characterized by *a.* thrombosis of a major arterial vessel; *b.* embolism of some minor one; and *c.* chronic inflammation of the artery, (arterio-sclerosis). 4. The latter morbid process represents the commonest cause of senile gangrene. It arises from a retardation of the blood current, accompanied with an increase in the arterial tension. 5. The retardation of the current may result, on one side, from failure of the cardiac action (decrease in energy, etc.), and on the other from venous stasis with capillary obstruction. 6. The author's experiments (on dogs) seem to point out that primary morbid changes arise in veins (phlebo-sclerosis).—*Pratch*, 1889, No. 4.

III. Terebene as a Surgical Dressing Material. By Prof. TIMOFEI I. BOGOMOLOFF (St. Petersburg, Russia). Terebene, prepared and described first by Steles de Vglom, has been introduced into surgical practice by Dr. Vladimir I. Radulovitch, of Orel, about 1868-9. It has been used ever since at the Orel Feinsky Hospital, with best results, as an antiseptic means for irrigating wounds (and even as an internal disinfectant in cases of tubercular enteritis, etc.). In 1878 Dr. Bond has published his well-known experiments showing that the substance possesses powerful disinfectant and antiseptic properties. Later on, Dr. Wood has recommended it as a most valuable dressing material emanating a very pleasant odor, yielding on evaporation igol, deodorizing putrid ulcers and wounds, and destroying bacteria without coagulating proteids. The drug was subsequently used—and that most successfully—by several British and French surgeons in a great number of cases of exarticulations and amputations, in atonic ulcers, uterine cancer, etc. Prof. Bogomoloff similarly eulogizes terebene as a cheap and effective antiseptic, disinfectant and deodorizing agent, but at the same time he draws attention that commercial terebene is often impure (contains an undecomposed turpentine oil and various accessory products of distillation), and hence, sometimes manifests a local irritant action (gives rise to blisters, etc.). The writer recommends the following method for preparing a chemically pure and non-irritating terebene: Take 10 or 20 parts of turpen-

tine oil and 1 part of concentrated sulphuric acid, mix them in a large china bowl and let the mixture stand for 24 hours; then decant the upper strata of the fluid, shake the portion with soda and subject to distillation at from 150° to 160° C. The purity of the product is to be tested by fuchsin which is absolutely impossible in a pure terebene, and by metlilene-violet and iodoform which are dissolved therein, the better the purer the preparation is. Moreover, a pure terebene disguises iodoform odor most completely; in fact, is the best deodorisant for the drug yet known. The distillation gives the following products: 1. A resin which is employed for disinfecting cess-pools, etc., and a fluid residuum. The fluid is subjected to a further distillation, and then gives 2. a gaseous terebene, and 3. a dark-brown resin. The latter constitutes an excellent material for preparing terebene soaps and a terebene paper. The exceedingly cheap paper is prepared of 6 ounces of the resin with 1 ounce of *oleum cocos*, and $\frac{1}{2}$ ounce of paraffine. 4. When soaked in water, the resin gives a terebene lotion which represents a most valuable deodorizing and disinfectant means in surgical and obstetrical practice.—*Transactions of the Third General Meeting of Russian Medical Men at St. Petersburg, 1889, No. 10.*

HEAD AND NECK.

I. Injection of Perchloride of Iron in Cavernous Angioma of Cheek. By Prof. NIKOLAI STUDENSKY (Kazan, Russia). A hospital nurse, æt. 22 years, sought the writer's advice for a huge blue turgid tumor of her right cheek of 20 years' standing. The new growth reached from the upper edge of the auricle down to the chin, (16 cm.), and from the posterior edge of the ramus of the lower jaw up to the canine fossa and right angle of the mouth (8 cm.). It involved the whole thickness of the cheek (6 cm.) as well as the tonsil, and an adjacent portion of the soft palate. It disappeared on pressure. On its cutaneous aspect there was seen a vertical scar representing a trace of some operative attempts which had been made by a country practitioner about three years before, to be given up in view of a tremendous hæmorrhage. The girl expressed an ardent desire to

get rid of her tumor on account both of disfigurement and agonizing pain about the temporal region. At first, the introduction of silk ligatures through the new growth was tried by the author for 3 months. No diminution in size having ensued, Prof. Studensky commenced to inject into the tumor a 25 per cent solution of perchloride of iron, one drop every 5 or 6 days. Since the injection was invariably followed by an intense pain of about 3 days duration, and sometimes also by fever ($40^{\circ}\text{C}.$), he soon reduced the strength of the solution to 10 per cent, the pain becoming somewhat more tolerable. A dense inflammatory infiltration set in around the puncture after each injection. Already, in a fortnight, a distinct shrinking could be noticed. In 5 or 6 months the tumor entirely lost its cavernous character, as far as the cutaneous aspect and the thickness of the cheek were concerned. It became dense, fibroid, and by far smaller later on, the author preceeded to inject the solution also into the affected tonsil and soft palate. Up to the date (February, 1888) as many as 200 injections have been made. Externally, there remain at present only slight traces of the former tumor, while the patient's general state is quite satisfactory, the temporal pain having disappeared. The treatment, however, is still continued, since, on any stoppage of 1 or 1½ months duration, there come out here and there bluish, elastic, vascular nodules of a cavernous character. The injections are made into those ever appearing small angiomas. On the whole, however, Prof. Studensky is obviously satisfied with the results achieved. He publishes his case to show that this old plan of dealing with an angioma, when practised with due caution, remains quite free from any grave complications (such as thrombosis and suppuration with lethal issue), which have been the cause of its fairly complete disappearance from the surgical horizon.—*Khirurgichesky Vestnik*, March and April, 1888.

II. Treatment of Pain after Teeth Extraction. By Dr. N. BEGANSKY (St. Petersburg, Russia). The author divides cases of dental pain after teeth extraction into two distinct clinical categories, in one of which the symptom makes its appearance immediately after

the operation, and in the other on a second or third day. The former occurrence is observed commonly in cases of dental caries complicated with periodontitis (of any stage). The pain is characterized by an intolerable severity and is said to be dependant upon the alveolus being tightly plugged with a firm blood-clot involving flaps of a torn and inflamed periosteum and, sometimes, also exposed ends of nerves. The best treatment here is constituted by a forcible irrigation of the alveolus with 3% solution of carbolic acid, which acts both as a disinfectant and anæsthetic. In the other groups of cases the pain is relatively less intense and is caused simply by an inflammatory reaction about the alveolar wound, which arises in consequence of an infection by food-particles, oral discharges, etc. The septic inflammation is to be treated by an initial irrigation with the carbolic lotion, after which the alveolus is to be thoroughly dried and plugged with a gauze tampon soaked in the same solution. If suppuration be present, the alveolus should be well powdered with iodoform before plugging; the plug should be covered with a cotton-wool pledget which is to be changed every 1 or 2 hours. Any narcotic drugs are said to remain entirely useless in either of the categories—*Zubovratchebnyi Vestnik*, December, 1888.

III. Mucous Cyst of Dorsum of the Tongue. By Dr. W. ZOEZE-MANTEUFFEL (Dorpat, Russia). A gentleman, aged 50, came to the writer with complaints of a painless but gradually increasing swelling of his tongue, which had been noticed by him first about 8 months before, and of late been greatly interfering with his speech and swallowing any solid food. On examination, the anterior part of the dorsum was found to be occupied by a symmetrically developed tumor of the size and shape of a hen's egg. Backward, it reached nearly as far as the circumvallate papillæ; on either side there remained intact only a narrow strip of the parenchyma of the organ. The swelling was covered with a normal mucous membrane; it was elastic and fluctuating. A puncture with a Pravaz's syringe drew out about 30 cm. of a milky, slightly opalescent fluid. The patient's speech was jabbering and lisping (*lallend*). An incision, $1\frac{1}{2}$ cm. long, was made, several cubic centimetres of the same fluid escaping. The wall of the cyst

was found to be perfectly smooth, measuring about 2 mm. in thickness and consisting of the mucous membrane and submucous coat. The cavity was washed with thymol, and a drainage tube inserted. There were slight febrile movements (38° C.) and a considerable swelling of the parts about the night-fall, but on the next day the temperature became normal, while the swelling subsided after the local use of ice. The drainage tube was removed the 9th day. About the 16th day the patient came with his wound completely healed by a scarcely perceptible scar, his tongue and speech being quite normal. No recidive occurred up to date (six months have elapsed). The microscope showed that the fluid removed contained mucous corpuscles of various sizes. According to the examination by Professor Carl Schmidt, the fluid represented a thick, viscid, colorless, alkaline mucoid matter, which did not change starch, and consisted of 95.396 water, 3.946 mucin and other organic substances, and 0.658 mineral bodies. In short, the tumor was nothing else than a muccus cyst. Dr. Manteuffel was unable to find in the international literature any other instance of the development of a mucous cyst in the anterior part of the dorsum of the tongue. According to Henle (*Handbuch d. Systemat. Anatomie*, 1886, pp. 129, a. 133), precisely this region is void of glandular structures. The tumor could not possibly have developed from a process of the *foramen cecum*, since otherwise the cyst would be situated somewhere posteriorly, or at all events, if anteriorly, there would be present then *two* cysts (correspondingly to a terminal bifurcation of the said process), and never a *single symmetrical* cyst. Dr. Manteuffel comes to the conclusion that the tumor has developed from "an erratic (*verirrte*) mucous gland exposed to some accidental irritation," the patient being in the habit of cleansing his tongue with a blunt knife.—*St. Petersburg Medicinische Wochenschrift* No. 2, 1888.

IV. A simple Method of Tonsillotomy. By Dr. G. LEVITSKY, (Russia). The writer recommends the following plan for excision of hypertrophied tonsils, which may be resorted to when no special instruments are under hand. The fauces and gland having been cocaineised and the patient seated on a chair, an assistant takes his position behind

and fixes the patient's head. The operator plunges a sharp hook into the lowest portion of the tonsil and commissions another assistant to produce a constant but slight traction towards the other gland. Then the surgeon depresses the patient's tongue with a spatula (in his left hand) and introduces a scalpel (with his right hand) to pass over the tonsil, outside of the hook, up to the posterior arch, and cuts off the hooked portion by to-and-fro movements. Any after-bleeding is easily arrested by ice-water gargling, after which some disinfecting mouth-washes are ordered.—*Novosti Terapii*, December, 1888.

VALERIUS IDELSON (Berne).

CHEST AND ABDOMEN.

I. Tumors of the Breast at the Heidelberg Clinic. By GEO. B. SCHMIDT (Heidelberg). Author has constructed a statistical paper upon 150 cases of tumor of the breast occurring in the clinic at Heidelberg and there operated upon. The carcinomata make up 82.6 of all the mammary tumors. This corresponds closely to 82% of the Bilioth statistics. Of 150 cases only 51 occurred in well-to-do private individuals. Author has adopted in his ætiological tables the division of age, followed by Velpeau, Bilioth, Volkmann and Winwarter, Henry, etc. He finds that the greatest number of cases of carcinoma occur between 41 and 50 years. Most of the cases of Bilioth occurred in Jewesses, who generally marry at a very early period of life. Author finds that none of his cases occurred before the thirty first or after the seventy-third year of life. Up to the forty-eighth year (prime) 52 cases were affected, at the climactic (48-58) 43 cases, and after this period 24 cases. Among the 150 cases 13 were not married. Of 122 women (of whom note were taken) 56 nursed their children, of the remainder 32 did not nurse and of 84 we find no data in this regard.

Of 109 women who had borne children 24 had mastitis; of these two had several attacks. Since these attacks of mastitis author found that a variable time intervened before the symptoms of disease manifested themselves. This time ranged from 1 to 36 years. In six cases a history of traumatism could be obtained. This preceded the

tumor from one-half to six years. Mastitis and trauma in the author's belief predisposes to a deposition of diseased tissue in the breast. Author found 10 cases in which there was a positive assertion as to previous family affections similar to that of the patient. The mother or grandmother had suffered with diseased mamma (carcinoma), or the father had suffered from carcinoma of the stomach, or the mother from a carcinoma of the thyroid. In an interesting case of the author the disease affected a patient of whom three sisters and an aunt had suffered from carcinoma (*vide* paper) of the breast or other organs.

Author has been able to find only 82 cases in which he could review with certainty the anatomical characters of the extirpated growths. The acinous form (17), the tubular form (36), the schirrhous (28) and the colloid (1) were represented. In 98 cases 63 were sufferers of pain to various degrees. In five cases the skin and glands were not affected. In 10 the skin only. In 12 cases the axillary glands were affected alone and in 84 cases both glands and skin, in this latter rubrik of cases the disease had a mean duration of 17 months. The patients presented themselves for operation, on the average 14.7 months after the beginning of the disease. In 94 cases amputation with thorough extirpation of glands was resorted to. In nine cases simple extirpation of the tumor was performed.

Four per cent of 112 cases died as a direct result of the operative interference (erysipelas 4, fat emboli 1), 72 of the remaining 98 cases have been followed by letter since operation. Of these 18 (18.3 per cent) are still living, 16 free from a return of disease. Two live with a return of disease ($2\frac{1}{2}$ to $1\frac{1}{4}$ years after operation). The return of disease occurred 1 month (4), 2 to 6 months (35), 7 to 12 months (15), 13 to 18 months (5), 25 to 36 months (3), 37 to 48 months (3), 1 to 6 years (1), after 7 years (1).

Metastasis occurred as follows: Liver (12), pleura (12), lung (6), brain (4), stomach (1), vertebrae (6), long bones (2), head (2), sternum (2), scapula (1), general carcinosis (1). In addition to the above the author records two cases of epithelial carcinoma, two cases of carcinoma of the mamma in the head. The sarcomata form $7\frac{1}{2}$ % of the

operated mammary tumors in the Heidelberg Clinic.—*Beitrage zur Klin Chir. von P. Bruns, Bd. iv, heft 1.*

HENRY KOPLIK (New York).

II. The Question of Acute Strangulation of the Intestinal Wall. By Dr. CARL LAUENSTEIN (Hamburg). In the latest edition of his text book, König concludes that the data thus far derived from autopsies do not authorize us to admit the acute constriction of a small part of the wall of a not previously sacculated intestine. Lorenz is of the same opinion; while Reichel, on the ground of his experience in the Breslau clinic, maintains the occurrence of acute constriction of the intestinal wall.

Roser holds the same views as he expressed in 1844, namely, that the occurrence of an acute lateral constriction of a not previously sacculated intestinal wall, is an error of observation, and he takes this ground because the condition cannot be explained physically, or be brought about experimentally. But Roser admits incarcerated hernia of the intestinal wall.

As a proof of the occurrence of acute constriction of the intestinal wall the author reports the following case:

The patient, a woman, æt. 44 years, mother of several children, was seen May 3, 1888.

Three years previously, after a confinement, had acquired a left sided hernia, not till one year after did she wear a truss, and she wore it up till four months ago. In general, the patient, during the last year, had a movement from the bowels every one or two days. The patient had for the last three days pain in the abdomen, and on the evening of May 2, she had two movements from the bowels. During the night of May 2, and 3, the pains in the abdomen augmented and their starting point was from the hernia. Emesis soon set in, patient vomited 12 times during the night, the vomited matter tasted bitter and was of a greenish color.

The author saw the patient on the afternoon of May 3, and found a left sided femoral hernia, about the size of a pigeon's egg.

Herniotomy was performed, the sac contained a large quantity of

reddish turbid inodorous fluid. After the fluid had flown off the sac was split and held apart, and in the depths of this funnel-shaped sac toward the neck was seen a smooth, brownish red tumor as large as a small cherry, which undoubtedly sprung from the intestine.

After notching the tight constriction in an upward direction, the intestine was drawn forward; it was a coil of small intestines, of which only a longish, oval piece about the size of a silver quarter, situated on the wall, opposite the mesenteric attachment; had become incarcerated. This was sharply limited by a distinct black furrow from the surrounding intestine, which in the neighborhood was slightly reddened and shiny, but otherwise normal; the constricted wall was paralyzed and showed in its middle a black spot about the size of a lentil. By seizing the coil of intestine above and below the incarcerated point and making it tense the constricted part which occupied scarcely one half of the circumference of the intestine bulged out in a marked manner, and by removal of the intestinal air pressure, by opening the fingers, the part fell in flabbily. The mesentery belonging to this loop of intestine was perfectly normal. The application of a few crystals of common salt on the gut, near the constriction, according to Nothnagel's direction, caused a slight peristasis which extended over the constricted portion, this asserted the viability of the intestine. The gut was then returned in the abdominal cavity and the wound closed. The patient made a perfect recovery.

According to the author the case is a typical one of acute constriction of the intestinal wall from the fact that the patient had regular movement from the bowels up to the night before the operation, as well as from the conditions found on operating.

The cause of the constriction was the extremely narrow femoral ring. The author thinks that Nothnagel's experiment is of great value in all cases of hernioty when the gut appears of doubtful viability, for, if after the application of a few crystals of salt an evident peristalsis is set up the intestine can be considered viable and may be safely returned to the abdominal cavity.—*Deutsche Med. Wochenschrift*, No. 44.

III. Suppurating Bubonocoele. By THOMAS BRYANT (London). The patient was admitted into Guy's Hospital under Mr. Bryant. His age was 21 years. Ten days previous he noticed a small swelling in left groin, not painful until six days before, when he had a dull, aching sort of pain there. Bowels confined. Took two pills on two occasions which relieved his bowels four times in the ten days. Taxis had been freely applied. There was a small hard swelling in left groin, irreducible; no impulse on coughing. It was not very painful. He felt sick but had not vomited. Bowels not opened for three days. Swelling dull on percussion. It was regarded as an irreducible omental hernia, and next day Mr. Bryant operated, under an anæsthetic. An incision three inches long was made over the swelling in the direction of Poupart's ligament. When the skin and tissues were cut through pus escaped, and a piece of suppurating omentum was seen. An aneurism needle was passed through the upper parts of the omentum and it was ligatured with catgut and cut off. Wound was then plugged with iodoform gauze and left to granulate up. Patient made an uninterrupted recovery.—*Lancet*, Oct. 27.

IV. Hernia into the Foramen of Winslow. By FREDERICK TREVES, F.R.C.S. (London.) Patient, æt. 26 years, well developed, muscular and robust; never been ill, was steady, knew nothing of dyspepsia. On April 9, ate a hearty dinner at 3 P. M., finishing up with a considerable number of periwinkles. At 5 P. M. was suddenly seized with violent abdominal pain, situated in the umbilical region; could not recline, was bent double, became faint, broke out into cold perspiration; pain at first intermittent; abdomen not tender; vomited on 10th; nothing passed per anum. Opium was administered and bowels relieved by enema. Abdomen became swollen, especially marked in epigastrium. Admitted into the London Hospital on 11th. Great prostration, pinched face and sunken eyes of acute abdominal trouble. Tongue brown and dry, temperature subnormal, pulse soft, small and feeble. Lying upon back with knees drawn up. A little brownish fluid with faint intestinal odor vomited every half hour. Much pain about umbilicus; abdomen moderately distended; conspicuous bulging of an-

terior wall in the epigastric and hypochondriac regions; summit of swelling in median line; tenderness in epigastrium; rectal examination revealed nothing. On the 17th the abdomen was opened in median line below umbilicus. Cæcum was first sought, but neither it nor ascending colon could be felt. Left colon and sigmoid flexure were then found to be empty. It was then discovered that there was no true mesentery to small intestine. A coil of bowel was followed till a constricting ring in the epigastrium was reached, through which the bowel passed. This ring was above the position of the duodeno-jejunal fossa and had no direct relation to vertebral column. It was now surmised that it was the foramen of Winslow. In the tissues in front of the ring an artery, clearly the hepatic, could be felt pulsating. Three feet of small intestine were reduced, but it was found impossible to reduce further a distinct coil of intestine. It was also impossible to enlarge the opening. The patient never rallied. Necropsy: Commencing general peritonitis. When the abdominal cavity was fully exposed a coil of large intestine, so enormously distended as to be four inches in diameter, was found lying in the left hypochondriac region immediately under the costal cartilages of the left side. Below it the stomach, slightly distended and somewhat displaced forward and to the left, presented itself. No other viscera were to be seen except the liver and coils of the small intestine. Further examination showed that the cæcum had passed through the foramen of Winslow, and had become strangulated by the margin of that aperture. The colon, on entering the snare, had passed from right to left; the cæcum was to the extreme left of the abdominal cavity, and had forced its way through the anterior layer of the gastro-hepatic omentum, so that the vermiform appendix was actually lying on the anterior aspect of the lesser curvature of the stomach, close to the œsophagus. The diameter of the strangulated colon measured nearly five inches. This part of the bowel was nearly five inches. Both patches were limited to the ascending colon, while the other was twice as large. The intestine had given way a little in the latter situation, and fecal matter had found its way into the lesser cavity of the peritoneum. The colon outside or beyond the foramen of Winslow turned very abruptly to the left, and was then repre-

sented by the distended segment of large intestine lying above the stomach. On reaching the splenic flexure, the bowel was so sharply bent upon itself as to be again occluded. Whole spinal intestine was distended. Some four or five inches of the terminal parts of the ileum were still found within the hernial cavity. It had passed in with the cæcum, but was only partially strangulated. At the seat of stricture the colon was in front of the small intestine. Of the strangulated colon the cæcum was the part that had suffered least. There was a descending meso-colon of moderate length. The colon may be described as being very sharply bent upon itself at the foramen of Winslow. The situation of this acute bending, the seat of the stricture, would correspond to about the centre of the transverse colon. The bowel from this point to the tip of the cæcum was involved in the strangulation. The remaining half of the transverse colon was dilated by reason of the abrupt manner in which the bowel was again bent upon itself at the splenic flexure. There was no trace of an hepatic flexure. It was evident that the cæcum was undescended, and had led the way through the foramen, which admitted four fingers. It was found quite impossible to reduce the strangulated hernia. Reduction could not be effected until the hepatic artery and portal vein and bile duct had been divided. Mr. Treves expresses a belief that this form of hernia can only take place when an abnormality exists in the intestines and mesentery. Mr. Treves was only able to find four recorded instances of this form of hernia, viz., Rokitansky, Blandin, Majoli and Eliot. In the fully reported cases stress is laid on the epigastric pain, upon the presence of a swelling in that region, and upon the existence of dulness over the swollen district. In no instance was there jaundice.—*Lancet*, Oct. 13.

H. H. TAYLOR (London)

EXTREMITIES.

I. Conservative Treatment of Gunshot Wound of the Humerus. By DR. PAVEL A. GEIER (Kaluga, Russia). A well-made and nourished young soldier was shot with a rifle discharged at a short distance from him. On examination one-half hour later, there was found a circular wound of the size of a shillingpiece, with de-

pressed edges, situated on the anterior surface of the right arm 2 cm. above the axilla, while on the line separating the outer aspect of the arm from the posterior one, at a somewhat lower level, there was seen another, a little larger, and oval opening, with everted lacerated lips. Probing and manipulations showed that there was present an extracapsular comminuted fracture of the surgical neck of the humerus, while large vessels and nerves remained intact. Having washed out the bullet channel with a 93 per cent carbolic solution, Dr. Geier introduced iodoform plugs, dressed the parts with carbolized wadding and gauze and duly immobilized the limb in splints. On the third day a fenestrated plaster-of-Paris dressing was applied, the wounds being daily washed out and dressed as before. The patient felt comfortable, the temperature never rising above 38° C. On changing the plaster dressing on the 61st day, the fracture was found united, but there were still present fistulous openings with fungating granulations, while a probe struck against a whole collection of freely lying sequestra. Accordingly, on the 66th day, a vertical incision down to the bone was made anteriorly midway between the entrance and exit openings, and 6 large fragments with several small splinters were extracted, after which the wound was washed out with the carbolic lotion, the drainage tubes, passing through the bullet wounds and the incision, inserted, and an antiseptic dressing applied. In a few days the temperature fell to the standard, the purulent discharge rapidly lessened, and all the wounds subsequently soundly closed. The man recovered with his limb practically intact in its functions. As Dr. Geier observes, his case furnishes an additional proof that the modern antiseptic conservative surgery can attain ideal results even in such grave cases as a gunshot comminuted fracture of a long bone in an immediate proximity with a large joint.—*Proceedings of the Kaluga Medical Society for 1887*.

VALERIUS IDELSON (Berne).

II. Two Cases of Gangrene of the Foot with Diabetes Mellitus. By DR. SCHUSTER (Aachen). The author reports two cases of gangrene of the lower extremity complicating diabetes melli-

tus. The first case was an early amputation of the foot for gangrene of the toes, followed later on by gangrene in the amputation wound, then the discovery of the diabetes, 5% of sugar being present in the urine, and finally a cure of the wound.

The second case presented gangrene of the foot, occurring within five weeks after a slight operation on the toe, with discovery of the diabetes, 10% of sugar nine days before death. Death 6 weeks after beginning of the gangrene.

The author, in reporting these cases, says that diabetes renders the tissue prone to gangrenous inflammation after the slightest lesions, and unfortunately the diagnosis of diabetes is only made when the gangrenous process has existed for some time.

Quoting König's article in No. 13 of the *Centralblatt f. Chirurgie* for 1887, he states that in serious cases of gangrene the presence of diabetes should not prevent an operation, even though the diabetes has not been ameliorated by treatment, for occasionally the amputation of the gangrenous limb may save the patient's life.—*Deutsche Med. Wochenschrift*, No. 44, 1888.

F. C. HUSSON (New York.)

GENITO-URINARY ORGANS.

I. Radical Cure of Hydrocele. By HENRY MORRIS (London). It may be safely said that there is no treatment of hydrocele, however severe, which has not been followed by relapse. Morris has known of cases of antiseptic incision (Volkmann's) followed by recurrence, and has seen excision of vaginal sac performed with success after both iodine injection and free incision have failed. He relates two cases in which a recurrence of the hydrocele occurred after an excision of the vaginal tunic of the testis, which in all probability was not complete. Unless the entire vaginal investment of the organ is removed there can be no absolute guarantee of success; the slightest portion left behind may serve as the nucleus of a new formation, as in the case of dermoid, sebaceous and other cysts. The difficulties in the way of an absolute assurance of a complete extirpation of the tunica vaginalis testis, must be apparent

There does not seem to be any choice, according to Morris, between treatment by injection, on the one hand, and incision and excision on the other, either as to certainty of result or duration of treatment. It does not appear that either the thickness opacity of the sac, the great size of the tumor, the encysted nature of the hydrocele, or even failure of the iodine treatment constitute sufficiently good reason for a rejection of the latter in favor of incision and excision. But on the other hand, there seems to be nothing which need to deter the surgeon from incising or excising a hydrocele under either of the above conditions, unless it be that a cutting operation is objected to by the patient, or deemed dangerous in the individual case. A preference, however, may be given to incision or excision. (1) When we are in doubt as to the precise nature of the relations of the hydrocele sac, *e. g.*, as to whether it is a congenital hydrocele or a hydrocele of a hernial sac. (2) in some cases where hernia, whether reducible or irreducible complicates a hydrocele. (3) Where a foreign body in the tunica vaginalis is the cause of a hydrocele. (4) When, as in a case recently operated upon by Morris, a vaginal hydrocele is associated on the same side with an encysted hydrocele of the cord and a bubonocoele. In this case excision of both the hydrocele and the hernial sac and closure of the pillars of the external abdominal ring were successfully accomplished at the same time.—*Am. Jour. Med. Science*, August, 1888.

G. R. FOWLER (Brooklyn).

II. On Inflammatory Diseases of the Seminal Vesicle.
By JORDAN LLOYD (Birmingham). This paper is written with the view of showing:

1. That inflammatory disorders of the seminal vesicles and their ducts are not uncommon.
2. That they are in many respects analogous to inflammatory disease of the Fallopian tubes in women.
3. That while occurring sometimes primarily, they are, as a rule, secondary to inflammation of the urethra.

4. That the ejaculatory ducts may become obstructed and the seminal vesicles consequently hyper-distended.

5. That termination by suppuration is exceptional.

6. That when suppuration occurs it should be dealt with by incision from the perineum rather than from the rectum.

7. That gonorrhœa is by far the most common originator of these disorders.

8. That they are frequently concomitant with gonorrhœal epididymis.

9. That they are usually diagnosed as inflammations of the prostate or neck of the bladder.

10. That while certain suppurative phenomena are suggestive of them their diagnosis can only be made by objective examination from the rectum and bladder.—*Author's abstract of paper read at British Medical Asso. Meeting, Glasgow, August, 1888.*

JORDAN LLOYD (Birmingham).

III. Successful Case of Extirpation of the Kidney for Pyonephrosis. By Mr. KNOX (Glasgow). The patient, a woman, æt. 38 years, was admitted, with a large tumor in the left lumbar region; 12 months previously she had begun to experience much difficulty in micturition, accompanied with straining and pain above pubes. Urine was pale and muddy. Shivering fits occasionally occurred, with feverishness which lasted two days. During the last six months before admission the symptoms increased in severity. The appearance of the patient was barely healthy, and there was no anasarca. Pulse 100, regular; temperature normal. On examining the abdomen a large tumor occupied the left lumbar region, passing upward under costal arch, and downward to the crest of the ilium. It was rounded, slightly movable with respiration, and on altering the position of the patient, distinctly fluctuant. The urine was acid, turbid when passed, and on handling deposited a thick layer of pus. The right urethra was catheterized and some clear, healthy urine obtained from it. The diagnosis of an abscess in the region of the left kidney having been made, the following operative interference was adopted. An incision was

made at the outer border of the erector spina from the last rib, curving downward and outward to the iliac crest. The capsule of the kidney was easily reached, on scraping through which the kidney presented as an elastic, fluctuating tumor, surrounded by a large quantity of thick, turbid pus, to which exit was given. The kidney structure was found much diseased, owing to the pressure of numerous small abscesses; the organ was, therefore, separated from its capsule and removed, the pedicle being ligatured with prepared silk and then cut across. No hæmorrhage occurred. A large drain was inserted to the bottom of the wound and wire sutures used. Antiseptic dressings were applied. No complications occurred during the process toward convalescence. The patient was discharged cured seven weeks after the operation, and a year afterward she still continued in good health. The appearance of the kidney after removal was that of extreme pyonephrosis — *Medical Press and Circular*, August, 15, 1888.

H. PERCY DUNN (London).

IV. Passage of Gas and Feces Through the Urethra ; Colotomy ; Recovery. By H. CRIPPS (London). The patient, a man, æt. 30, first noticed pain in the hypogastric region about 10 months before admission, the pains being only felt during the time of the passage of a motion. Some months previously blood and slime were passed with the motions. At time of admission patient required to pass urine nearly every quarter of an hour, and after the urine ceases to flow flatus often escapes with considerable noise. Urine is turbid with distinct fæcal odor. The motions are semi-solid, but no urine flows out of the rectum. Nothing definite could be felt either through the abdominal wall or in the rectum. For some weeks the patient was kept in bed on a milk diet, but no improvement following, it was decided to explore abdomen and open the bowel above the site of communication.

The section was made in the left inguinal region, and with the finger a firm mass, suggestive of malignant disease, was discovered, binding the sigmoid flexure to the bladder. The bowel was traced upward from this, and a loop of the lower part of the descending colon drawn

out and carefully united to the parietal peritoneum and skin. The bowel was opened on the fourth day. The wound healed rapidly and the patient left the hospital in a month. Neither air nor fæces passed into the bladder from the time of opening the bowel; the urine became clear; the cystitis disappeared, and when last seen, three months later, the patient still continued well.

In some remarks which the author appends, attention is drawn to the comparative rarity of the cases similar to the one under discussion, and the advantages to be derived from colotomy performed in the inguinal region. Should, however, the fistulous communication be between the bladder and small intestine, the operation would be worse than useless.—*Lancet*, Oct., 6, 1888.

H. PERCY DUNN (London).

GYNÆ OLOGICAL.

I. Traumatic Lesions of External Genitals During Pregnancy. By Dr. AFANASY G. BORIAKOVSKY (Kiev). A strong and healthy peasant woman, æt. 18, in the seventh month of her first pregnancy, when carrying a heavy load of wood along some scaffolding about the second story of her house, slipped and fell astride on a wooden balustrade below. A formidable hæmorrhage followed. When admitted, shortly after the accident, to Professor G. E. Rein's clinic, she was suffering from acute anæmia of a high degree. On examination, under chloroform, there was found a triangular contused and lacerated, "sponge-like," profusely-bleeding wound of a dark, livid color, occupying the urethral and vestibular regions; there was present, besides, a deep transverse laceration of the minor labia, especially the left one, and an extensive separation of all soft tissues from the subjacent anterior surface of the pubes. In spite of all efforts, the urethral orifice could not be found, either on the present occasion or on another examination undertaken on the next day. Neither could the woman pass her urine, notwithstanding a strong desire. During 14 hours which passed between the two examinations, hæmorrhage was controlled by means of an iodoform plug, fixed by a T bandage. On removing the dressing, the wound began profusely to bleed again. In

view of the fact, as well as in view of the absolute retention of urine, Prof. Rein proceeded to operate as follows: Having exposed and cleansed the wound, he made an incision into the urethra (at the junction of its anterior and middle thirds) through the vaginal wall and introduced into the canal a sharply bent probe pointing with its end forward. The end at once emerged out of the external orifice of the urethra, which proved to be widely displaced to the left and buried amongst intensely disintegrated soft tissues. Having emptied the bladder with Nélaton's catheter, the operator first closed the vaginal wound with silk sutures; then fixed the urethral orifice in its natural site by means of numerous deep silk sutures radiating from and around the meatus toward the labia, pubes and vagina; afterward stitched all other lesions about the vestibule, and plugged the vagina with iodoform gauze. The after-treatment consisted in catheterization, irrigation of the vagina and the wound with carbolic and sublimate lotions, and opium enemata—the latter for relieving pain and inhibiting any uterine contractions. About the 3d day after the accident foetal cardiac sounds became inaudible. About the 7th the wound was found healed *per secundam*, except the periphery of the urethra where the first intention was obtained. On the 14th, the patient was delivered of a macerated foetus, the puerperium running its course without any complications. On the 22d two last sutures were removed. On the 23d, the patient's micturition returned to the normal, and on the 25th, she left, well and sound. When re-examined, 2 months after the accident, she continued to be free from any discomfort on passing water and walking. Neither urethral stricture nor vagino-urethral fistule resulted. The only traces left by the severe lesions were cicatricial contraction of the left minor labium and a pink scar adherent to the pubes at the site of the vestibular wound. Analyzing his remarkable case, Dr. Boriakovsky dwells mainly on the following points of great practical interest.

I. *Influence of Traumatic Injuries to the External Genitals on the Course of Pregnancy.* The foetus was expelled in anteriorly intact, flabby, opaque, greenish membranes with offensive placenta; the placental attachments of the membranes, however, were torn away and the

expulsion of the ovum was followed by escape of a tumblerful of a thick, fetid, brown fluid. In other words, the violence had caused a serious lesion of the ovum, with intra-uterine extravasation leading to the foetus's death. Basing his views on the case above, as well as on similar cases published by Thoman (1, in the *Wiener Med. Presse*, 1867, vol. VIII, p. 958) and Mazacz (3, *ibid*, 1873, vol. XIX, p. 189), the author lays down the following propositions concerning traumatic injuries in pregnant women: 1. Acute anæmia, even of high grades, by itself does not induce a premature access of labor, and does not give rise to foetal death. 2. The maternal anæmia, however, brings about anæmia and lowers vitality of the foetus. 3. Not all traumatic injuries to a pregnant woman's genitals cause interruption of pregnancy. As a matter of fact, in Mazacz's and Thoman's 4 cases referring to women in from a 6th to an 8th month of gravidity, parturition set in at full term. 4. The interruption can be expected only in such cases where traumatic violence produces a severe concussion of the woman's whole frame, with grave local lesions about the womb and ovum. 5. All other moments, such as general anæmia, reflex action, fright, appear to play a but very subordinate part in the matter.

II. *Traumatic Hæmorrhage From Female Genitals.* In the writer's case, bleeding seemingly was mostly of a parenchymatous character, but was so profuse and obstinate that, had it been left to itself, it could cause the woman's death. Traumatic injuries to female external genitals and vagina are said to be almost invariably accompanied with severe hæmorrhage, which is dependent upon a very rich vascularity of the parts. During pregnancy, that biological peculiarity becomes greatly intensified.

III. *Its Treatment.* The best hæmostatic means in cases under consideration are said to be pressure (by a tampon) and, especially, suturing which not only does arrest bleeding, but also allows the wound to heal kindly, as a rule, *per primam*. In this case, with its singular lesions, the wounds could be closed only after colpo-urethrotomy which had been resorted to as the only means for making out the whereabouts of the meatus. In this regard the case is yet unique. Dr. Boriakovsky believes that the operation is fully justified under

similar circumstances; it is the more so that during pregnancy (with its increased plastic functions) traumatic lesions generally, surgical cut wounds in particular, tend to heal most kindly and rapidly. As a matter of fact, in his case no urethro-vaginal fistule resulted from the operation in question.—*Proceedings of the Kier Obstetrical and Gynecological Society* for 1887, Vol. I.

II. On Supra-vaginal Amputation of the Uterus. By DR. PETR. A. RAKUZA (Odessa, Russia). The author has made the operation in 12 cases. In 9 of them, it was resorted to on account of uterine fibro-myomata; in a tenth case on account of hæmatometra with hæmatosalpinx and hæmatocolpos; in an eleventh, the amputation became necessary in the course of an unusually difficult double ovariectomy, where there were met with extensive and extremely dense adhesions of cysts with the broad ligaments and womb; in the remaining case, Porro's Cæsarean section for osteo-sarcoma of the pelvis and femur was performed. In seven cases the operation was made after an extra-peritoneal method (first described by Kleberg in 1875), all the patients making good recovery. In the other five cases, an intra-peritoneal operation was performed, with 3 recoveries and 2 deaths from peritonitis. Dr. Rakuza's general deductions are these: 1. The extra-peritoneal method gives by far better results than the intra-peritoneal. 2. Even under strictest antiseptic precautions the intra-peritoneal amputation is always associated with the danger of a secondary infection (through the cervical canal). 3. The operation is justified only in cases of pedunculated fibroids and in such ones where the stump is very short.—(*Transaction of the Third General Meeting of Russian Medical Men at St. Petersburg, 1889, No. 10*).

VALERIUS IDEISON (Berne).

III. Intraligamentous Tubal Pregnancy; Successful Removal By Abdominal Section of a Four-Pound Living Child with all its Appendages. By JOSEPH EASTMAN, M.D., (Indianapolis). Mrs. C., æt. 39 years, bore one child nineteen years ago. Suffered from frequent paroxysms of intense pain and rapidly increasing abdominal enlargement, since

her flow stopped last Christmas. Admitted to hospital on July 9; operation July 10. Abdominal inspection and palpation showed tumor extending from near pubes upward, and to the right reaching near liver. Conjoined manipulation disclosed uterus normal in size, well up between tumor and symphysis pubis. There was not less than three inches of fat between integument and tumor. The author failed to detect sound of foetal heart. Breasts not enlarged. Very little discoloration around the nipple.

Abdominal section revealed extra-uterine pregnancy, tubal variety. The tube seemed to have much of the right broad ligament surrounding its uterine attachment, as if the tube had been originally beneath the peritoneal fold of the broad ligament. The sac containing the child was a dark purple and tore open easily on the touch of small forceps. Placenta was nearly under line of abdominal incision, yet he was enabled to open sac and extract child without detaching much of its tissue.

Any manipulation of sac caused hæmorrhage. He determined at once to remove tube and placenta in mass, and began by separating an adherent intestine and then an adherent omentum, being compelled to use pressure forceps and ligate five times before he reached and surrounded the tube with his fingers. By this time there was free hæmorrhage from the margins of placenta and tube. He applied Eastman's clamp below his fingers around the neck of the sac, and found by this means he could so constrict as to arrest all bleeding; then cut off above clamp, and using No. 14 iron-dyed silk, quilted the pedicle (which the clamp had made) with cobbler's stitch.

He washed out the peritoneal cavity with pure water (temperature 105°) three times, put in glass drainage tube, and closed wound with silk-gut, and found that the patient had suffered little shock. Her highest temperature was 102°. Bowels moved on third day, and drainage tube was removed on fifth day.

The mother made a complete recovery and the child which was eight months advanced was living and six months later weighed eleven pounds.—*Am. Jour. Obstetrics*.

JOSEPH EASTMAN (Indianapolis).

REVIEWS OF BOOKS.

INTESTINAL SURGERY. By N. SENN, M. D., PH. D. 8vo, pp. 269. Chicago, W. T. Keener, 1889.

This book, as the author announces in his preface, is not intended to serve the purpose of a complete text book on intestinal surgery. It consists of two parts, the first containing a resumé of the best literature on the surgical treatment of intestinal obstruction; the second giving the author's own original work in this department of surgery. The book consists in fact of the three elaborate memoirs recently presented by Professor Senn at the International Medical Congress, at Washington in 1887, at the American Medical Association meeting of 1888, and at the Congress of American Physicians and Surgeons of 1888. The portion of the book devoted to the subject of intestinal obstruction occupies more than half of the whole book, and is a systematic and thorough discussion of all the phases of that subject. The author is an advocate of early operative interference in cases of intestinal obstruction. His language is that "the treatment of a case of intestinal obstruction upon the expectant plan until gangrene or perforation has taken place, which, if submitted in time to proper surgical treatment, might have been cured by one stroke of the scissors, should be considered as gross negligence for which the modern aggressive physician and surgeon can offer no justification or apology."

Most practitioners will for a long time to come see in this, *if* an uncertain quantity of sufficiently great proportions to justify them in many cases in assuming an expectant and palliative attitude. The most important work of the future must be in the line of establishing aids to diagnosis. A most valuable contribution in this direction has been made by Dr. Senn by his experiments showing the practicability of forcing gases by moderate pressure along the whole length of the intestinal tract. The methods of this procedure and its applications are fully detailed in the course of this book.

In the matter of the operative technique of intestinal surgery no more brilliant or far-reaching improvement has ever been made than that of intestinal anastomosis by the use of absorbable approximative plates, first brought to the notice of the profession by Dr. Senn in his address before the Surgical Section of the Washington Congress. The extent to which this device is susceptible of being made of service in

overcoming the difficulties presented by many varieties of intestinal obstruction is by no means the least of the many instructive features of the present work.

The author condemns utterly the establishment of an artificial anus in any case, by bringing the bowel up into a median incision which had been made for exploratory purposes, but advocates for the enterotomy when such a result is indicated, a separate small incision in one of the inguinal regions. For the relief of obstruction caused by inoperable malignant disease of the rectum, he protests against lumbar colotomy, and approves the suggestion of Madelung to open the abdomen by a lateral incision, divide the colon transversely as low down as possible, invaginate, and close by suture the distal end and drop it back into the peritoneal cavity, and then suture the proximal end into the wound. This book is of special interest in that it brings together and presents as a whole the results of the special labors of the author in the field of intestinal surgery, together with an elaborate and carefully weighed study of the literature of the subject.

L. S. PILCHER.

DER HOSPITALBRAND. Prof. Dr. ROSENBACH (Göttingen). *Deutsche Chirurgie von Billroth und Luecke*. Lief 6. Stuttgart, F. Euke, 1888. New York, G. E. Stechert.

HOSPITAL GANGRENE.

The author of this volume (113 pages) of the system of German surgery had occasion to witness a small epidemic of hospital gangrene after the Franco-German war, in 1872 and '73, in the Goettinger clinic, but only saw a few severe cases. The book, therefore, represents, for the most part, merely a historical compilation of the literature of the subject, but a very complete compilation, and, moreover, a critical one from a modern pathological and hygienic point of view.

The author believes that although hospital gangrene does not occur in hospital or general surgical practice, it may at any time appear again, even after having entirely disappeared for 10 or 20 years, and especially in times of war. It is this conviction that has prompted the author to describe the affection afresh. The contents of the volume are divided into a clinical part, a pathological part, diagnosis, prognosis, and therapy, hygiene, etiology and an historical sketch of the disease.

Culture-experiments and microscopical search for micro-organisms, which were made on specimens sent to the author by the courtesy of J. S. Billings from the Washington Museum did not lead to any bacteriological discovery of interest.

HANDBUCH DER KLEINEN CHIRURGIE, FÜR PRACTISCHE AERZTE VON
Dr. GUSTAV WOLZENDORFF. 2^{te} vermelute u. verlusserte Auflage,
Wien und Leipzig, Urban und Schwarzenberg, 1889. New York, G.
E. Stechert.

MANUAL OF MINOR SURGERY.

With the development of general surgery under the antiseptic system and other modern improvements general operative surgery has passed almost entirely into the hands of surgeons proper, and is to a great extent confined to hospital service. The general practitioner has become more and more limited to minor surgery. But with this limitation is combined the growth of minor surgery, so that much more is required nowadays of a book on minor surgery than was formerly the case.

The volume before us is written from this point of view, and presents, in the most satisfactory manner, all surgical enchiresses which may occur in daily practice. The subject-matter comprises bandaging and the treatment of fractures, including the use of plaster-of Paris for deformities, trusses, etc., antiseptic surgery, including all the newest methods of dressing and the preparation of the material, minor operative surgery, including hæmostatics and artificial destruction of tissue, aspiration and tapping, etc.; a chapter on anæsthetics is added. Of course the usual features of books on minor surgery are represented: Extraction of teeth, massage, vaccination, artificial respiration, baths, applications to the skin, and others.

Every portion of the book is as complete and as well up to date as can be wished. As a consequence the book is somewhat voluminous, 565 pages. It is well printed, and the profuse illustrations (525 in number) are all executed in the well-known excellent manner of the publishers. Altogether it is a most attractive book.

W. W. VAN ARSDALE.

BEITRÄGE ZUR KLINISCHEN CHIRURGIE VON DR. P. BRUNS. Tuebingen,
1888. Band iv, heft i. New York, G. E. Stechert.

CONTRIBUTIONS TO CLINICAL SURGERY. By Dr. P. BRUNS.

The above contains contributions from the clinics of Zursch, Heidelberg, Tübingen and Basel. This part contains eight articles, the most noteworthy of which will be reviewed at length in the ANNALS. Herni-

ological observations by Dr. Conrad Brunner is continued into part two. A novel deformity is described by Dr. Ernest Miller in an article entitled "ueber die Verbiegung des Schenkelhalses in Wachstumsalter." This shortening of the neck of the femur during the period of the growth of the bone has not been described. Its existence has been verified by the author at the autopsy table. There is in these cases no active inflammatory process of any kind. The diaphysis passes by the epiphysis of the bone. Rachitis is mentioned as a possible etiological factor. There are articles by Profs. Czerny and Bruns which we will review at a future date. Prof. A. Socin records a nephrectomy of a diseased horseshoe kidney.

HENRY KOPLIK.

SECTION CUTTING AND STAINING. By WALTER S. COLMAN, M. B.,
London.

This little work is what it professes to be, viz., a practical guide for beginners. It is very well gotten up, and the practice of printing the headings in large type is extremely handy for reference. It explains as concisely as possible the reasons for the different methods employed, and generally first describes the process which has been found most successful by the author. Mr. Colman gives a few hints as to the purchase of a microscope. We should here like to suggest that, if possible, the student should always endeavor to obtain a good instrument. Small and cheap ones have only a limited capacity, and their owners, if at all enthusiastic, will soon find the time comes when it can not do all he requires of it. The examination of sputum in disease is rapidly coming to be recognized as of much importance, especially as to its containing specific micro-organisms, and for this a substage condenser and good lens are indispensable; and these can only be adapted to the better class of microscopes. The author omits to mention Swift's bacteriological microscope, which we consider to be the best and cheapest of its kind; besides which it carries one of his $\frac{1}{12}$ oil immersion lens, a beautiful power and unequalled for the money. We would also suggest that the description for the preparation and staining cover glass specimens should be fuller, especially with regard to decolorizing bacilli. The last chapter is devoted to the examination of individual tissues. Altogether the book is much to be recommended. We feel sure it will do much to lighten the labor of the beginner, and to guide him to satisfactory results in his preparations.

H. H. TAYLOR.

- I. **ESSENTIALS OF PHYSIOLOGY.** By H. A. HARE, M. D., Demonstrator of Therapeutics and Instructor in Physical Diagnosis in the Medical Department, and Instructor in Physiology in the Biological Department of the University of Pennsylvania; Member of the American Society of Physiologists and of the American Society of Naturalists. Philadelphia, W. B. Saunders, 1888. 12mo., pp. 170, price, \$1.00.
- II. **ESSENTIALS OF ANATOMY.** Including Visceral Anatomy. By CHAS. B. NANCREDE, M. D., Senior Surgeon to Episcopal Hospital Surgeon to Jefferson College Hospital, formerly Lecturer on Osteology, etc., in Medical Department University of Pa.; Late Professor of General and Orthopedic Surgery in Philadelphia Polyclinic; and Lecturer on Surgery in Dartmouth Medical College, etc., etc. Philadelphia, W. B. Saunders, 1888. 12mo., pp. 352; price, \$1.00.
- III. **ESSENTIALS OF MEDICAL CHEMISTRY, ORGANIC AND INORGANIC,** containing also Questions on Medical Physics, Chemical Philosophy, Analytical Processes, Urinalysis and Toxicology. By LAWRENCE WOLFF, M. D., Demonstrator of Chemistry, Jefferson Medical College; Visiting Physician to German Hospital of Philadelphia, Member of Philadelphia College of Pharmacy, etc., etc. Philadelphia, W. B. Saunders, 1888. 12mo., pp. 214; price, \$1.00.
- IV. **ESSENTIALS OF SURGERY.**—Containing also, Surgical Landmarks, Minor and Operative Surgery, and a Complete Description, together with full Illustration of the Handkerchief and Roller Bandage. By EDWARD MARTIN, A. M., M. D., Instructor in Operative Surgery and Lecturer on Minor Surgery, University of Pennsylvania; Surgeon to the Out-patient Department of the Children's Hospital, and Surgical Registrar of the Philadelphia Hospital. Philadelphia. W. B. Saunders, 1888. 12mo., pp. 314; price, \$1.00.
- V. **ESSENTIALS OF OBSTETRICS.** By W. EASTERLY ASHTON, M. D., Demonstrator of Clinical Obstetrics in the Jefferson Medical College, and Chief of Clinic for Diseases of Women in the Jefferson Medical College. Philadelphia, W. B. Saunders, 1888. 12mo., pp. 220; price, \$1.00.
- VI. **HANDBOOK OF MATERIA MEDICA, PHARMACY AND THERAPEUTICS.** By CUTHEERT BOWEN, M.D. Philadelphia and London, F. A. Davis, 1888. 12mo., pp. 366; price, \$1.40.

We can see a very clearly defined field for works such as we have enumerated, although the abuse of them is unquestionably productive of evil to the medical student. They are of value to him in helping to

define and parcel out the avalanche of knowledge with which modern science is inclined to overwhelm him. They supplement the lectures of his instructors and the reading of his textbooks by affording a skeleton about which he can group the facts and details gained from more extensive study. They may also be used to no little advantage by the practitioner in presenting the main facts of his professional work in a suitable form for ready reference and complete classification. The form of questions and answers which is found in the works under consideration is peculiarly qualified to secure definiteness of information. In their proper places, then, as adjuvants to the more complete standard works, this class of books may be of the greatest advantage. But when used improperly as the sole source of information they may be productive of decided harm in leading the student into a narrow and inadequate conception of the breadth of medical science. In repressing a favorable opinion, then, of a work of this kind, the condition of proper use is invariably implied.

The essentials of physiology are most clearly and comprehensively outlined by Dr. Hare. His views will not be endorsed by all teachers, but they represent the opinions now most commonly advanced.

Dr. Nancrede has given us a work far more extensive in its character than any thing of the kind that has fallen under our observation. The medical student who shall have mastered its contents will certainly have acquired all the essential points of anatomy. Lucid in statement and terse in style, aside from the worn and imperfect illustrations, it is difficult to see how it could be improved.

Dr. Wolff seems to us to have been peculiarly happy in his presentation of those portions of chemistry of interest to the medical man. The questions are distinctly stated and the answers, framed with marked clearness, are fully up to the times.

While an acquaintance with no other work on surgery than the work of Dr. Martin would make the practitioner a rather dangerous character, yet in the field to which he has confined it, "as a framework upon which more detailed knowledge may be hung," it is a success. Comprehensive in scope, although necessarily bald in form, it is an unusually satisfactory condensation.

In Dr. Ashton's work on obstetrics, we find the subject so succinctly presented that a remarkably considerable amount of information is contained within a very limited space. The book certainly presents all the essentials of its subjects, and so much other valuable matter that its perusal will be of decided advantage to the busy practitioner.

Materia medica, pharmacy and therapeutics form so extensive a

combination that a condensation of the three subjects within the covers of a single small volume requires rare skill and judgment. In the main the work of Dr. Bowen is well done and the book is the best of the kind that we have seen. But the omission of agents now so commonly used as antipyrin, antifebrin, resorcin and other well established though recent drugs would seem to be a point worthy of change in another edition.

THE PATHOLOGY, CLINICAL HISTORY AND DIAGNOSIS OF AFFECTIONS OF THE MEDIASTINUM OTHER THAN THOSE OF THE HEART AND AORTA. The Fothergillian Essay for 1888. By HOBART AMORY HARE, B. Sc., M. D. Philadelphia, P. Blakiston, Son & Co., 1889. 8vo., pp. 150.

In this brochure the author presents an exhaustive study of mediastinal diseases embodying in tabular form the entire recorded literature of the subject together with a full analysis of the data obtained. The paper is succinctly stated and logically arranged, fully justifying the author's claim of greater surgical importance for his locality than is ordinarily admitted.

He summarizes his conclusions clearly as follows:

1. Cancer is more frequently found in the mediastinal spaces than any other morbid process.
2. Abscess is the morbid process next in frequency of occurrence.
3. Sarcoma occupies a third position as to frequency.
4. Lymphomata and lymphadenomata occupy a fourth place, but are much more rare than the others mentioned.
5. The anterior mediastinum is affected far more frequently than are the other two spaces.
6. Most mediastinal growths occur in males.
7. More males are affected than females by mediastinal disease, be that disease what it may.
8. Cancer and sarcoma of this space are necessarily fatal.
9. Abscess is recovered from in about 40 per cent of the cases.

PRACTICAL ANATOMY. A manual of dissections. By CHRISTOPHER HEATH, F.R.C.S. Seventh edition. Revised by RICKMAN J. GODLEE, M. S. Lond. Philadelphia, P. Blakiston, Son & Co., 1888. Small 84. pp. 598. Price, \$5.00.

Heath's dissecting manual has long been a popular dissecting-room companion, and the appearance of the seventh edition is an indication of continued recognition of its value. The present edition derives decided advantage from the revision of so accomplished an anatomist as Mr. Godlee.

JAMES E. PILCHER.

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